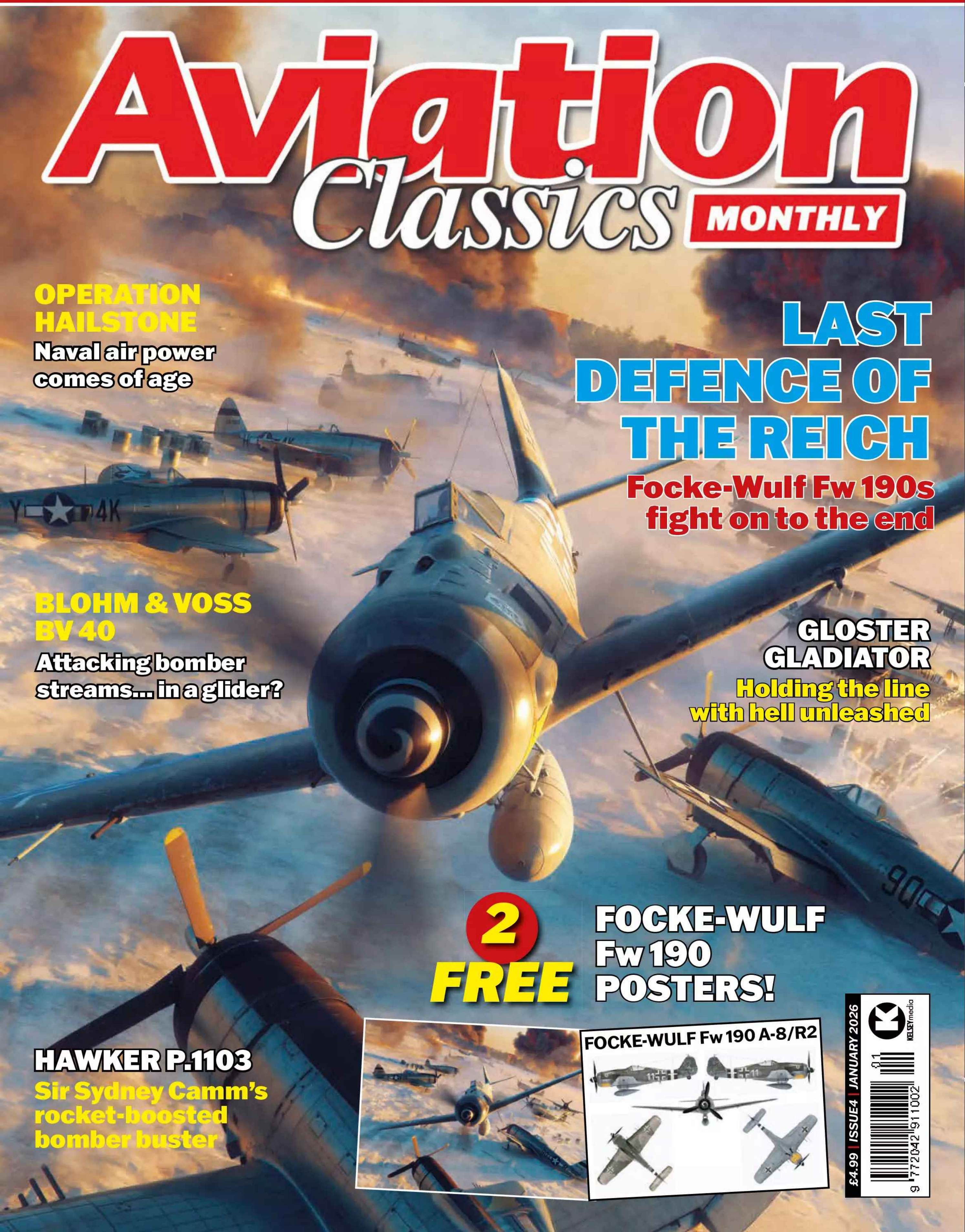
‘GUTLESS’ CUTLASS * YAKS IN ACTION

Aviation Classics MONTHLY



OPERATION HAILSTONE
Naval air power comes of age

LAST DEFENCE OF THE REICH

Focke-Wulf Fw 190s fight on to the end

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Attacking bomber streams… in a glider?

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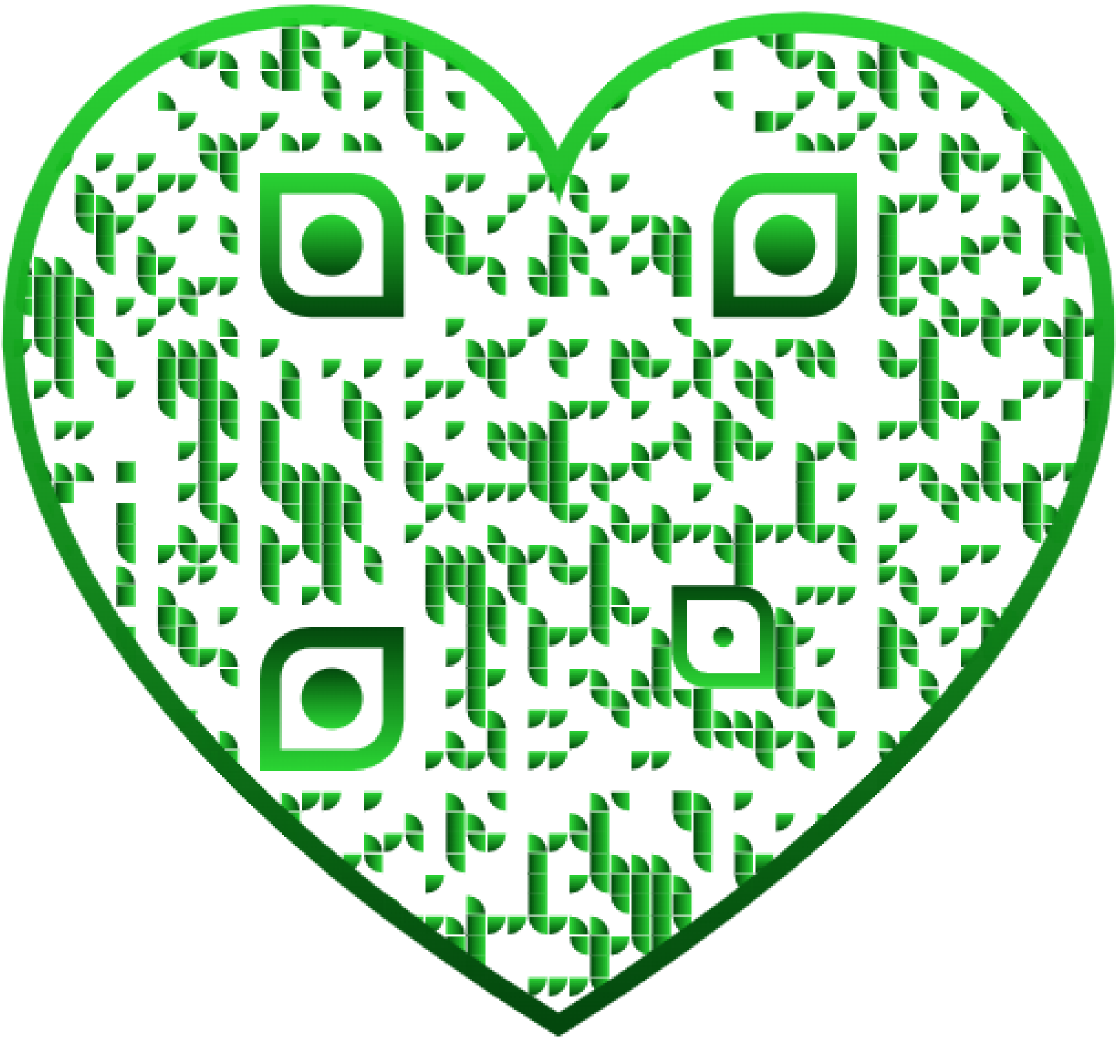
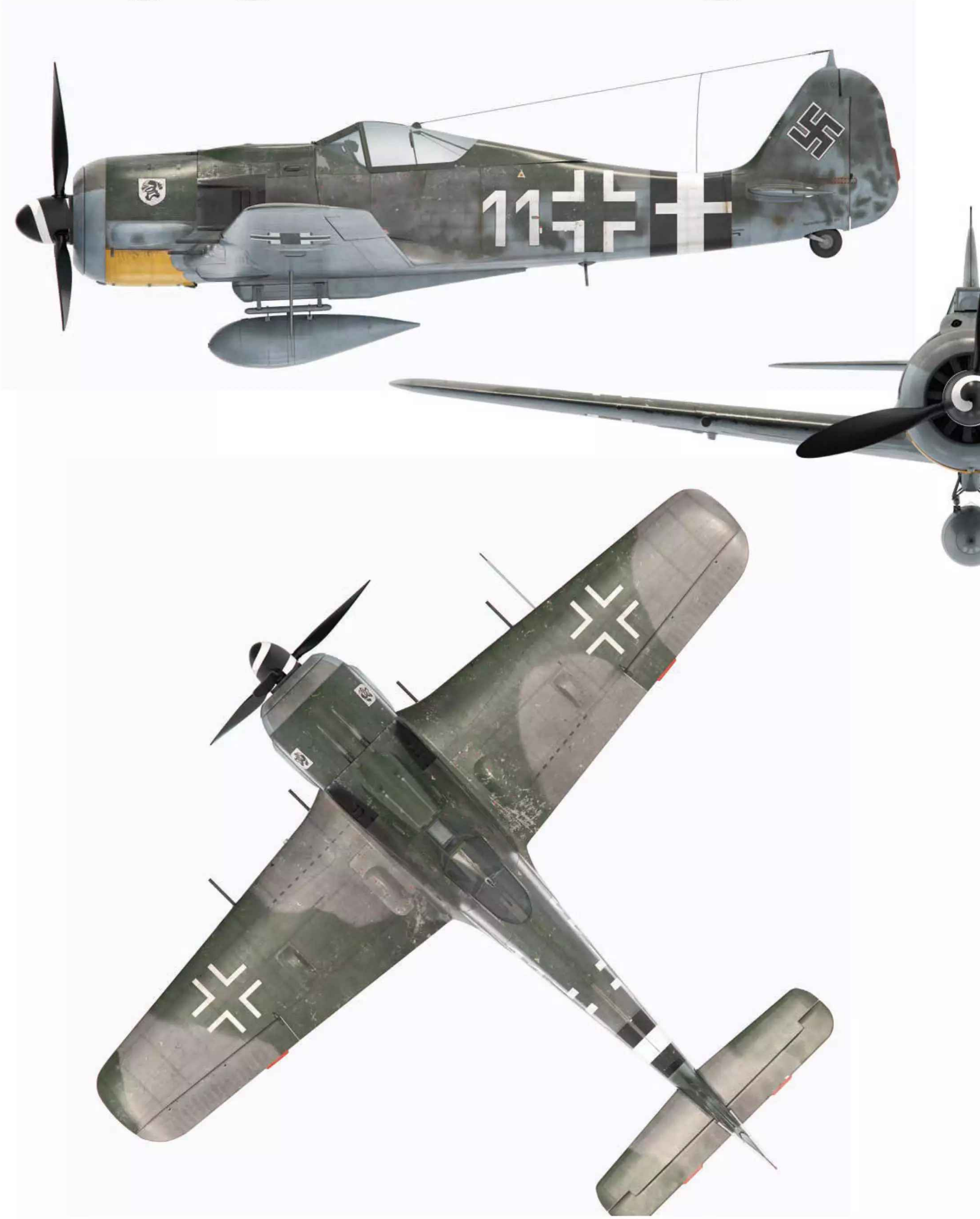
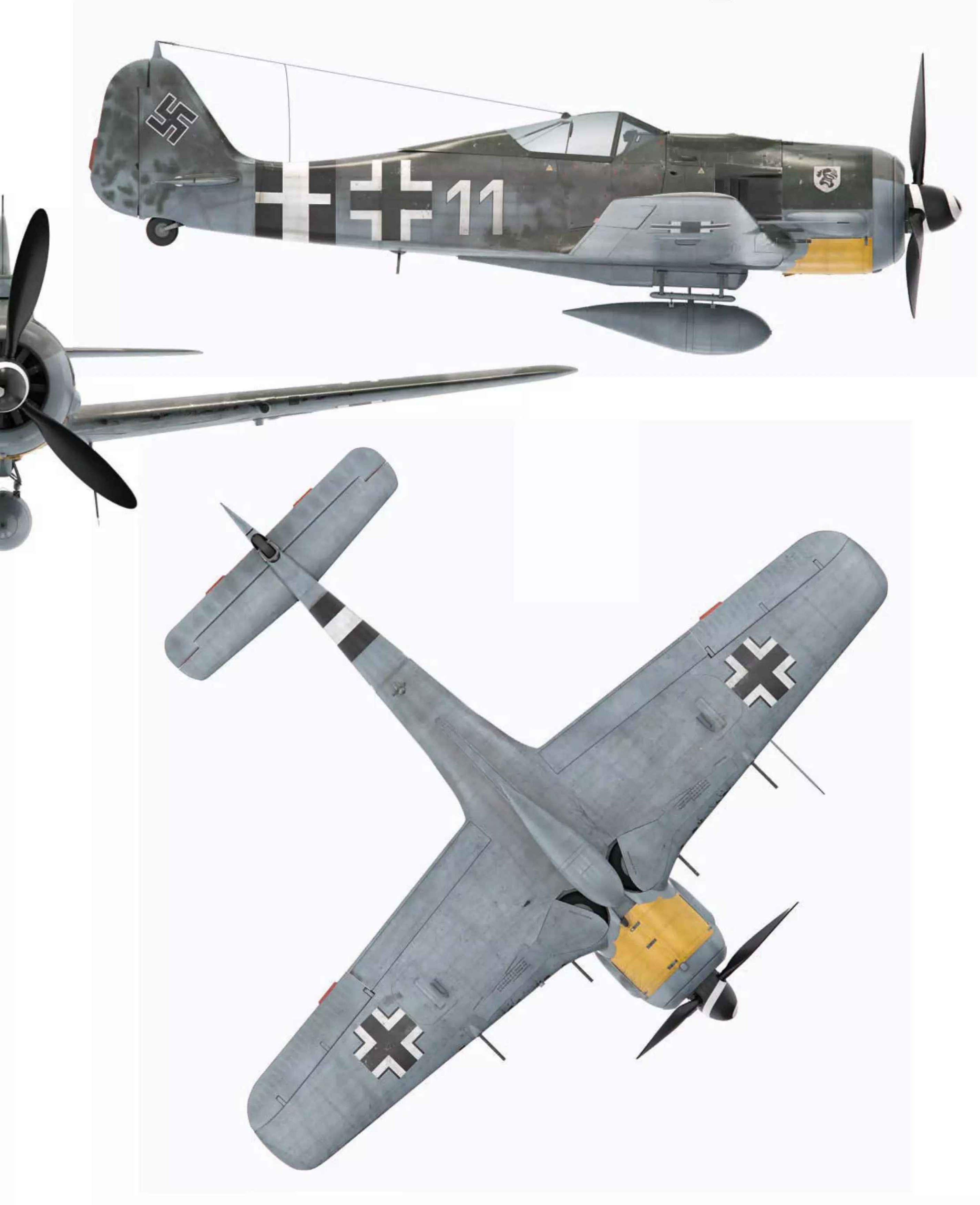


FOCKE-WULF



Fw 190 A-8/R2



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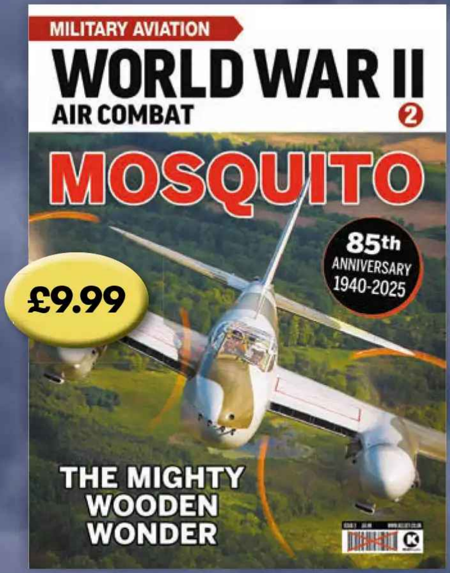
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Focke-Wulf Fw 190 A-8

SPECIFICATIONS

Type:	Single-seat interceptor fighter/fighter-bomber
Engine:	One BMW 801 D-2, 14-cylinder two-row radial, with a two-speed supercharger, a gearbox and a 12-cylinder cooling fan. The engine drives a three-bladed constant-speed propeller.
Wingspan:	34ft 5in (10.50m)
Length:	29ft (8.84m)
Height:	13ft (3.96m)
Wing Area:	197sq ft (10.30m²)
Empty Weight:	7,000lb (3,170kg)
Maximum T/O Weight:	10,800lb (4,900kg)
Maximum Level Speed (clean):	408mph (654km/h)
Initial Climb rate:	2,363ft (720m) per minute
Service Ceiling:	37,400ft (11,400m)
Normal Range:	500 miles (805km)
Armament:	(A-8/R-2) two 0.31in (7.9mm) MG 17 machine-guns, four 20mm MG 151/20 cannon, one 500kg (1,100lb) and two 250kg (550lb) bombs.

The Fw 190 was one of the most famous aircraft of the German Luftwaffe, and the A-8 version was produced in greater numbers than any other. Developed in 1944 and introduced into service in February of that year, its design built on earlier models, featuring a BMW 801 D-2 engine, a strengthened airframe, and additional cockpit armour, which was necessary for intercepting USAAF and RAF bombers over Germany. Due to the increased weight, the A-8's performance was affected compared to earlier variants.

The A-8 was essentially the same airframe as the earlier A-7 but featured a significant engine boost system and the related structural modifications to accommodate the new equipment.

The engine boost system was an improvement of the standard installation of the GM-1 nitrous oxide injection boost for the BMW 801 D-2 engine. This system injected liquid nitrous oxide to increase the engine's power for short bursts of up to ten minutes, improving high-altitude performance where previous Fw 190 A models were less effective. Some versions were compatible with the MW50 water-methanol injection system, which provided boosts at lower altitudes.

The Fw 190 A-8 played a vital role in the Defence of the Reich. It served extensively on the Eastern Front as a fighter and ground-attack aircraft due to its durability and stable handling on rough airfields.

Despite its strengths, the added weight from armour and systems reduced its performance and manoeuvrability, leaving it vulnerable to Allied fighters. ■

Welcome

Welcome to the fourth issue of *Aviation Classics Monthly*.

The festive period is a time for goodwill, celebrations, and taking a moment to pause. However, during wartime, militaries have often exploited this season to launch surprise attacks in an effort to gain a tactical advantage over their opponents. Unternehmen Bodenplatte (Operation Baseplate) exemplifies this approach by the Luftwaffe. Launched on January 1, 1945, the surprise, low-level, mass air attack involved 850 fighters and fighter-bombers, most of which were Fw 190s, targeting 17 Allied airfields in Belgium, the Netherlands, and France. The operation aimed to regain air superiority by destroying as many Allied aircraft on the ground as possible, along with stores, fuel supplies, and airfield infrastructure. Read the feature on pages 16 to 23 to discover whether it was successful.

Following a similar surprise air attack doctrine, the US Navy transformed naval air warfare through Operation Hailstone, which proved that coordinated, repeated strikes on enemy installations could succeed with limited losses. The detailed account of Operation Hailstone on pages 32 to 43 explains how this contributed to bringing an end to the war in the Pacific.

A recent visit to Brooklands Museum to see the Hawker P.1121, along with the feature on the Hawker P.1103 in this issue, served as a timely reminder of how far ahead the British aviation industry was in the fifties and sixties. Both in terms of design and potential performance levels. While many of the manufacturers' ideas did not progress beyond the drawing board, those that reached the factory floor were later cancelled by short-sighted political decisions made by the government at that time. I am still waiting to see a nation that relies solely on missiles instead of manned aircraft as a deterrent!

If you like what you see, why not subscribe? See pages 70-71 for details.

Enjoy the magazine.

Glenn

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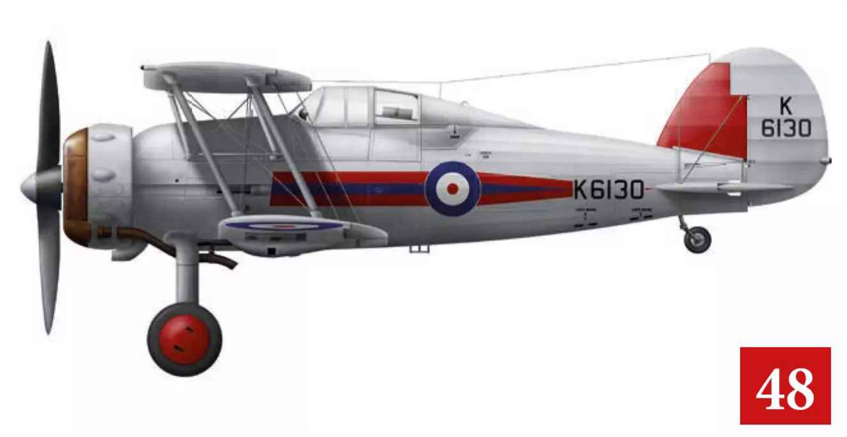

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The Hawker P.1103 was a concept developed by Hawker Aircraft to satisfy the British Operational Requirement F.155, which was the RAF's demand for an interceptor capable of intercepting Soviet supersonic nuclear bombers approaching UK airspace.

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Considered obsolete by the start of the Second World War, the type remained in RAF service, however, with the biplane claiming some notable kills during the early years of the war.

54 VOUGHT F7U CUTLASS

The striking-looking Cutlass incorporated a host of advanced technologies into a single airframe, which sadly were ahead of their time and led to the naval fighter earning a poor reputation among those who flew it.

58 YAKS OVER KÖNIGSBERG

Général Charles de Gaulle sent a Free French Air Force group to serve alongside the Soviet Air Force on the Eastern Front in 1942. The battle-hardened French pilots flew Yak fighters against Luftwaffe aircraft, intent on stopping the Soviet advance towards East Prussia's capital, Königsberg.

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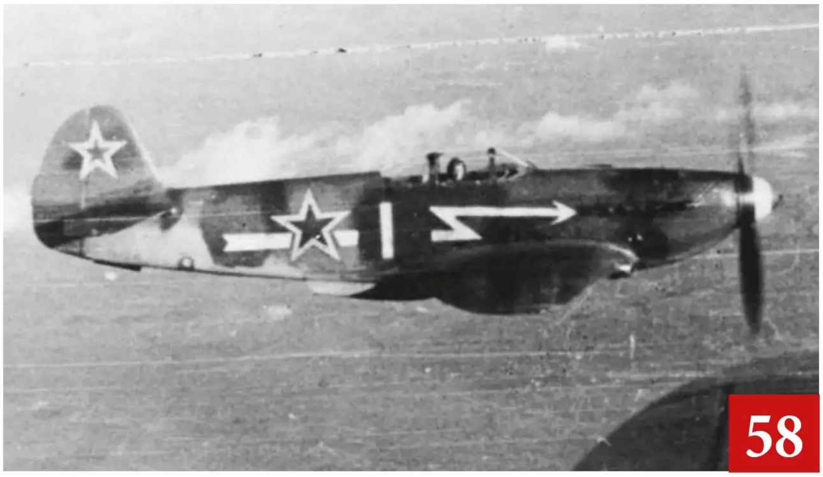
Originally designed to intercept bombers, the BV 40 armoured glider was repurposed as a weapon for suicide attacks on Allied shipping.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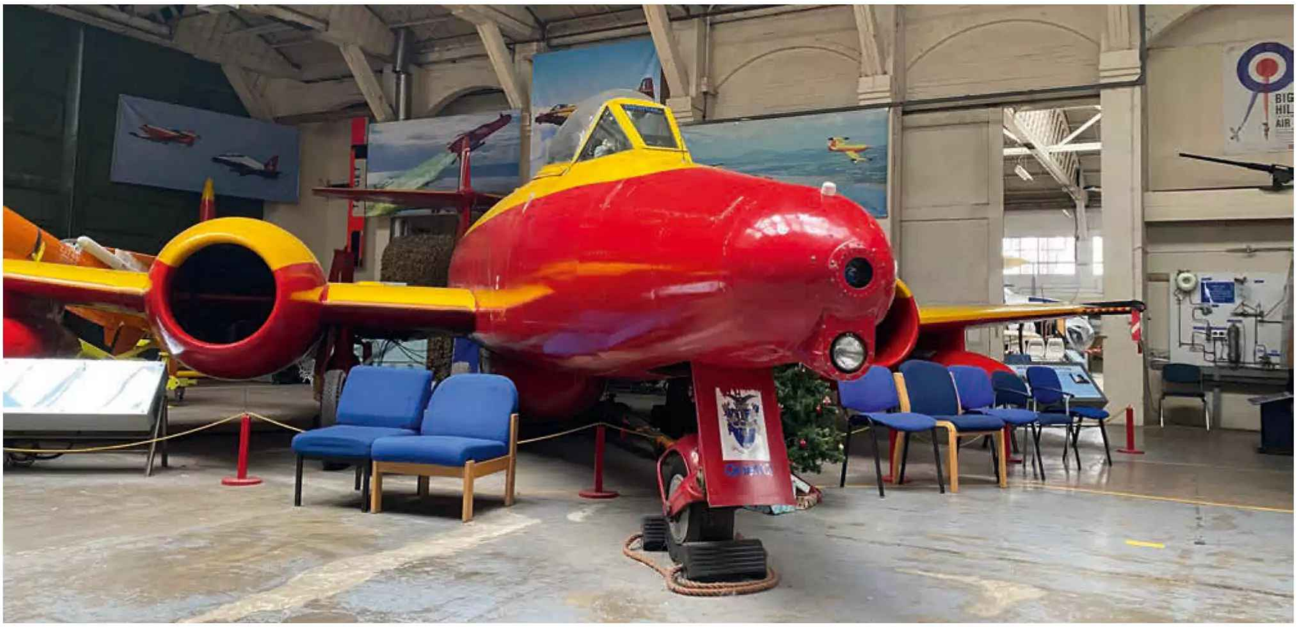
Determination and dedication earns King's award for museum volunteers

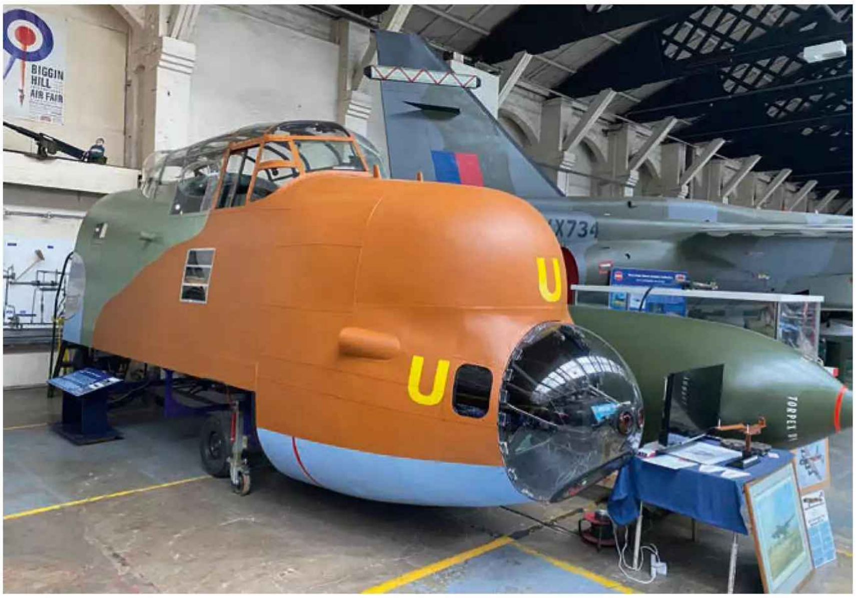


The BDAC mainly concentrates on flight testing and aircraft based at nearby Boscombe Down, such as this Meteor D16 WK800. However, if offered an airframe, the museum will do its best to ensure that, if it's beyond their capacity, the aircraft will be passed on to another collection rather than being scrapped.

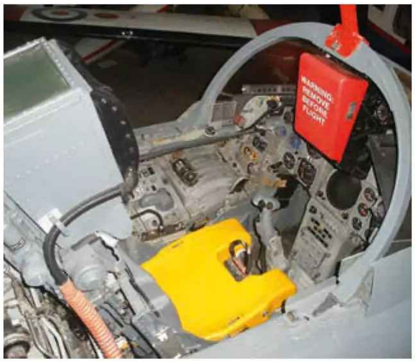
The recent announcement by the Boscombe Down Aviation Collection (BDAC) Museum at Old Sarum Airfield in Salisbury, Wiltshire, that it is to receive the King's Award for Voluntary Service, highlights the dedication of the museum staff and volunteers over the years. They have been restoring, displaying, and discussing the museum's exhibits with visitors who are keenly interested in aviation or simply there for a day out. John Sharpe MBE, Project Director at BDAC, told *Aviation Classics Monthly*: "I believe we have been very fortunate as a museum, in that we've built a steadily growing team of dedicated, passionate, and enthusiastic individuals committed to our objectives. I am endlessly grateful to them. It's because of their efforts that we feel truly honoured to receive this award. It's a national recognition of what these volunteers contribute daily within the museum—coming in through all weather conditions. At the moment, the hangars are not particularly warm, but they still come to share their enthusiasm for our work. Showing visitors the aircraft and, whenever possible, inviting them into the cockpit. I couldn't wish for a better team to work alongside. We're over the moon about the award if I am honest."

However, the museum is not lingering on the award's glory, as Sharpe and Dave Berryman, BDAC's Operations Director, recently told *Aviation Classics Monthly* when discussing what has been achieved in 2025 and the museum's plans for 2026.

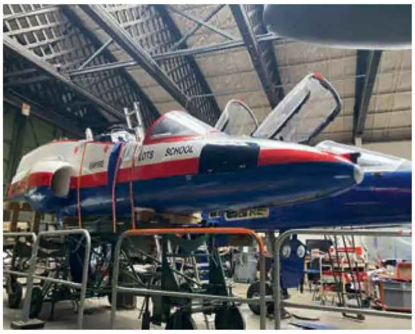
"We have adhered closely to the policy that the museum has, and we will



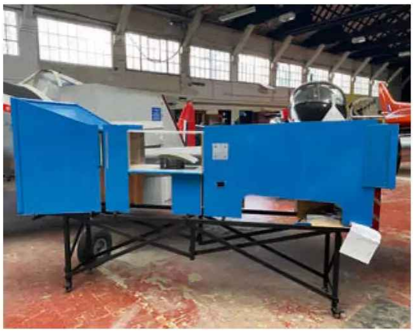
Completed this year, the impressive cockpit section of Lancaster PD130, a very rare B1 Special, features a full-scale replica of a 22,000lb bomb, which the B1 was modified to carry.



Volunteer staff who help restore airframes go to great lengths to ensure that, when the completed aircraft, such as the Tornado GR1 ZA319, is finished, it has a fully operational cockpit.



Work is now underway on another Raspberry Ripple scheme aircraft, alongside the Jaguar T2A XX145, this time a Hawk T1 (mod) XX343. After many years, enough airframe components have been sourced to enable a complete aircraft restoration.



Part of the STEM programme launched by the BDAC collection will demonstrate to younger generations how aircraft operate and what flight testing involves. This scale replica of a functioning wind tunnel is currently under construction.

continue to do so. This policy involves displaying aircraft associated with flight and flight testing at Boscombe Down, as well as related types from this base. Since relocating to Old Sarum, we have also explored flying activities in the local area. One challenge we are beginning to face is that genuine aircraft from the late 1920s and early 1930s that operated from here are quite rare to find. Apart from Spitfires and Hurricanes—which many museums already hold—it's the unique aircraft involved in flight testing at Old Sarum or that flew from the airfield that we seek. Many of these were built of wood and canvas, so they have not survived well.

"It's a challenging area for us to shed light on, and I am not quite sure how we will progress with this. However, in other areas we are making genuine progress, especially considering it is a relatively small museum. One of the highlights in 2025 was the completion of the front end of Lancaster PD130, which is a B1 Special, one of only 33 built," explains Sharpe.

The Lancaster nose section now on display at BDAC is the only surviving example of the B1 variant designed to carry 12,000lb and 22,000lb bombs during World War II. Inside, the nose section features a fully original interior, including a SABS bomb sight, which may be the only one of its kind remaining in the world. One of BDAC's volunteers built a full-size wooden replica of a 22,000lb bomb in two parts in his garage. Together, the display highlights a little-known mission of Avro Lancasters towards the end of the war. Occasionally, museum visitors are invited to go inside the nose section to experience how Bomber Command aircrews operated.

Returning to ongoing restoration work, alongside the Jaguar T2A XX145 *(see Aviation Classics Monthly, November 2025),* Sharpe adds: "Currently, the main restoration work on the Jaguar focuses on bringing it up to the standards of our Tornado GR.1T ZA319, which took about 18 months to complete. Former Tornado crew members who have sat in the aircraft have told us it feels like being back at home. The cockpit is fully restored and illuminated; it's a lively, breathing display, not just a piece of metal. Again, it's an aircraft that visitors can get close to. I know there are other Tornados on display, but I don't think any are quite like ZA319, that's for sure."

Berryman points out: "ZA319 had sat as a gate guard for 15 years and was just an empty hulk when it arrived, and what the volunteers have done here is phenomenal. It's in showroom condition". Sharpe continues: "We have been fortunate that Boscombe Down and RAF Heritage have kindly donated items that may not seem particularly exciting, like black boxes, which are like gold dust to us because we can reconnect these black boxes to an aircraft, and the landing lights or anti-collision lights will activate. We aim to get all these components to operate on any restoration we undertake."

Further restoration work is now underway on Hawk T.1 (mod) XX343, which crashed on take-off at Boscombe Down in April 1997 while serving with the Empire Test Pilots School. The wreckage was handed over to the museum, which had only recently opened.

"It had been robbed of about two million pounds' worth of spares. Some had been removed from it, and frankly, at the time we looked it over, we thought perhaps we could rebuild the front cockpits, but the rest is too far gone. However, all those years ago, I had always believed that this would happen one day. Actually, those days have arrived because the front end is up on a platform, and we are removing the intakes from the fuselage. We have also managed to secure an undamaged centre section, a rear fuselage, and a set of wings. So, we have most of what we need to rebuild XX343, and this project is now underway."

Sharpe is keen to point out that the restored aircraft, once completed, aren't intended to look like immaculate Airfix kits. He adds: "Both completed aircraft will resemble in-service, operational test aircraft. They will look a bit battered, slightly scruffy, and untidy because that's how they are. Although they never operated in theatre, they are outside a HAS on the hardstand, buffeted by the weather and walked on by test pilots during inspections, so that's how they will appear when they're finished."

But the BDAC collection is also reaching out to inspire the next generation of aviation enthusiasts through its STEM programme, which Berryman manages and is set to launch in the coming months. He explains:

"We're aiming to expand opportunities for the younger generation, whether through schools, Scout Groups, and Cadets; it's about offering a community service. Laverstock and Ford Parish Council are supporting the initiative and have allocated funds for assistance. It's about promoting us [BDAC] as a community asset, which the local council is very eager to do."

It's evident that the BDAC Collection has a wealth of projects in progress, and with the indication that more aircraft are expected to arrive in 2026, the museum is only going to soar, much like its exhibits.

All images credit: Glenn Sands

Veteran Nimrod made homeless

Nimrod XV232 arrived at Coventry Airport on May 11, 2010, following a delivery flight from RAF Kinloss, Scotland. In 2015, a group of enthusiasts established the Nimrod Preservation Group XV232 and has maintained the aircraft at the site in working order ever since.

Credit: Nimrod Preservation Group

The Nimrod Preservation Group XV232 (NPG XV232), which cares for XV232 at Coventry Airport, has been informed that it needs to vacate the site by 9 May 2026.

The group, along with other tenants, received a formal notice from Coventry Airport in early November stating that operations at the airfield must cease by May.

NPG XV232 released details on social media, adding, "This is a shock to everyone involved," and "We now face a number of critical decisions in a very short period of time."

At present, the group is exploring options for a new home for XV232 but recognises that dismantling, transporting, and reassembling a Nimrod will entail a substantial financial outlay. The NPG XV232 seeks to raise awareness of their situation and highlight the aircraft's challenges.

According to the group's website, they have been offered the services of one of the UK's leading independent production companies, which is providing assistance to create a YouTube channel featuring a series of two-minute 'shorts'. If funding is secured, they aim to produce a documentary about the RAF's Nimrod fleet.

If relocated, the complex nature of Nimrod XV232, which has fully functioning engines, a flight deck, hydraulics, control, and computer systems, could serve as an educational and training asset for STEM students. Volunteers involved with the aircraft have stated that it will be an ideal aerospace and educational resource if properly cared for.

A 1982 Falklands War veteran, XV232, carried out a reconnaissance flight that remains unmatched to this day. Supported by a fleet of Victor tankers, XV232 flew a total of 8,453 miles in 18 hours and 50 minutes while covertly observing Argentine naval movements in the South Atlantic. Specific details about this mission remain classified to this day.

Without a viable solution, the group has said that the aircraft may be at risk of being dismantled at its current location, an option it wants to avoid.

In a further online post, the Nimrod Preservation Group stated: "Our primary goal is to preserve XV322 as a lasting memorial to the UK's impressive maritime legacy. We are calling on the public, aviation enthusiasts, and anyone with knowledge, contacts, or ideas to help us find a solution." Despite the uncertainty, the group plans to continue limited operations at Coventry Airport.

For those able to help, visit: www.xv232.com

Chance to hear Vulcan howl again

The Vulcan to the Sky Trust (VTST) has announced that Avro Vulcan XH558 will once again howl as it performs public engine runs at Doncaster Sheffield Airport in 2026.

This marks a return for one of Britain's most beloved aircraft and a significant milestone in the Trust's ongoing effort to preserve and celebrate aviation heritage.

Engine runs involve starting and operating XH558's four Rolls-Royce Olympus engines while the aircraft remains on the ground, allowing visitors to witness and feel the legendary howl and vibration.

VTST is planning a series of public events throughout 2026, with specific dates to be announced soon. These events will take place at Doncaster Sheffield Airport, where XH558 is based, and will raise vital funds for the aircraft's ongoing preservation.

Marc Walters, chief executive of VTST, said: "This is fantastic news for our supporters and for the charity. The return of engine runs will not only reconnect the public with XH558 but also help us to raise vital funds to support her ongoing preservation. We are deeply grateful to FlyDoncaster for working closely with us to enable this to happen."

The restart of engine runs follows a difficult period for VTST, during which the charity has faced and still faces significant financial pressures. With the support and collaboration of FlyDoncaster, the Trust is now able to proceed with plans to reintroduce these popular events.

"We remain optimistic that, with a strong response to our fundraising appeal, continued cost-saving efforts, a successful Christmas season in our online store, and the return of engine runs in the new year, we can continue supporting XH558 for the foreseeable future," added Marc.

The Vulcan Experience, a long-term vision for a dedicated visitor centre and educational hub, remains a key goal for VTST. Meanwhile, the return of engine runs is a crucial step in maintaining public engagement and garnering the support needed to secure XH558's future.

Christian Foster, programme director – SY Airport City, said on behalf of FlyDoncaster, "The agreed programme of Vulcan engine runs marks a truly memorable date in the history of Doncaster Sheffield Airport. We are extremely excited about this proposition and urge members of the public to contact the Vulcan to the Sky Trust to support and visit this iconic aircraft."

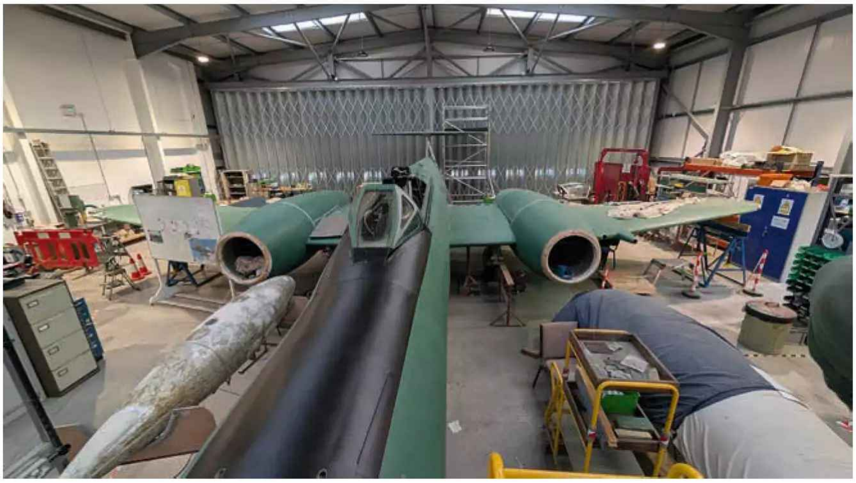
Further details, including event dates and ticketing information, will be released in the coming weeks.

To learn more or support the Vulcan to the Sky Trust, visit: www.vulcantothesky.org

The unique howl of the Vulcan's Rolls-Royce Olympus engines will be heard again at Doncaster Sheffield Airport in 2026.

Credit: VTST

Meteor gets its wings



With both wings now attached, WS807 is starting to resemble a Meteor and has begun to receive its final paint scheme.

Credit: Jet Age Museum

The Jet Age Museum in Gloucestershire has announced that its Meteor NF.14, WS807, has now had both its wings re-attached as part of its restoration, and the aircraft has begun receiving the silver painted finish it wore when in service.

Delivered to the RAF in 1954, WS807 served with several night-fighter squadrons before being retired and placed as a gate guardian at RAF Watton.

Once complete, WX807 will be painted in a striking silver and Dayglo red scheme, similar to the colours it wore while serving with No.2 Air Navigation School at Thorny Island and later with No.1 School of Navigation at Standishall, Suffolk.

Once work on the NF.14 Meteor is finished, another variant will enter the museum's workshop: a T.7 Meteor trainer, VW453, which is the oldest remaining complete example.

BBMF display season all wrapped up – and now the hard work really begins

With the conclusion of another busy 2025 air display season, the Royal Air Force Battle of Britain Memorial Flight (BBMF) engineers have begun their annual winter maintenance programme on the Flight.

With Lancaster PA474 in the care of The Aircraft Restoration Company (ARCo) at Duxford (see *Aviation Classics Monthly*, November 2025), which is undertaking the bombers' scheduled major maintenance programme, it is expected to last well into 2026. PA474 is due to return to the display circuit in 2027.

With the Lancaster relocated, it enables the RAF engineers to concentrate on the fighters within the Flight, with several aircraft undergoing various levels of servicing, termed Primary Star, an intermediate, less-intensive level of servicing that ensures all aircraft's components are inspected and repaired if necessary. Hawker Hurricane LF363 will undergo this process to extend the aircraft's flying hours before its scheduled Major and Minor Star maintenance programme in 2027. Also, Spitfire IIa P7350 will undergo this process, allowing for more in-depth servicing later and ensuring the Spitfire is ready for the 2026 display season.

Other fighters within the Flight are scheduled to return to RAF Coningsby, most notably Spitfire Mk Vb AB910, which has undergone two years of maintenance by the Spitfire Company at Biggin Hill. Once back at the RAF base, AB910 will carry out a 'shakedown' flight before being placed in protective storage in readiness for the 2026 air show season.

Aviation Classics Monthly will follow the maintenance progress of the BBMF as updates become available.

NEWS IN BRIEF

Collection scoops VIP Gazelle with luxury fit

An ex-VIP runabout Gazelle helicopter that had been at RAF Cosford has now joined the Boscombe Down Aviation Collection (BDAC).

Built by Westland in Somerset as a Gazelle HT Mk3, XW852 first flew on June 4, 1973, and was delivered to the RAF on July 16, 1973. It was one of 32 RAF Gazelles and was later converted to HCC.4 standard – with a luxury VIP interior.

It then served with 32 (The Royal) Squadron until 1998 when it went to storage at Fleetlands. It then moved to the Defence College of Technical Training at RAF Cosford in 2005 to serve as an instructional airframe until 2022.

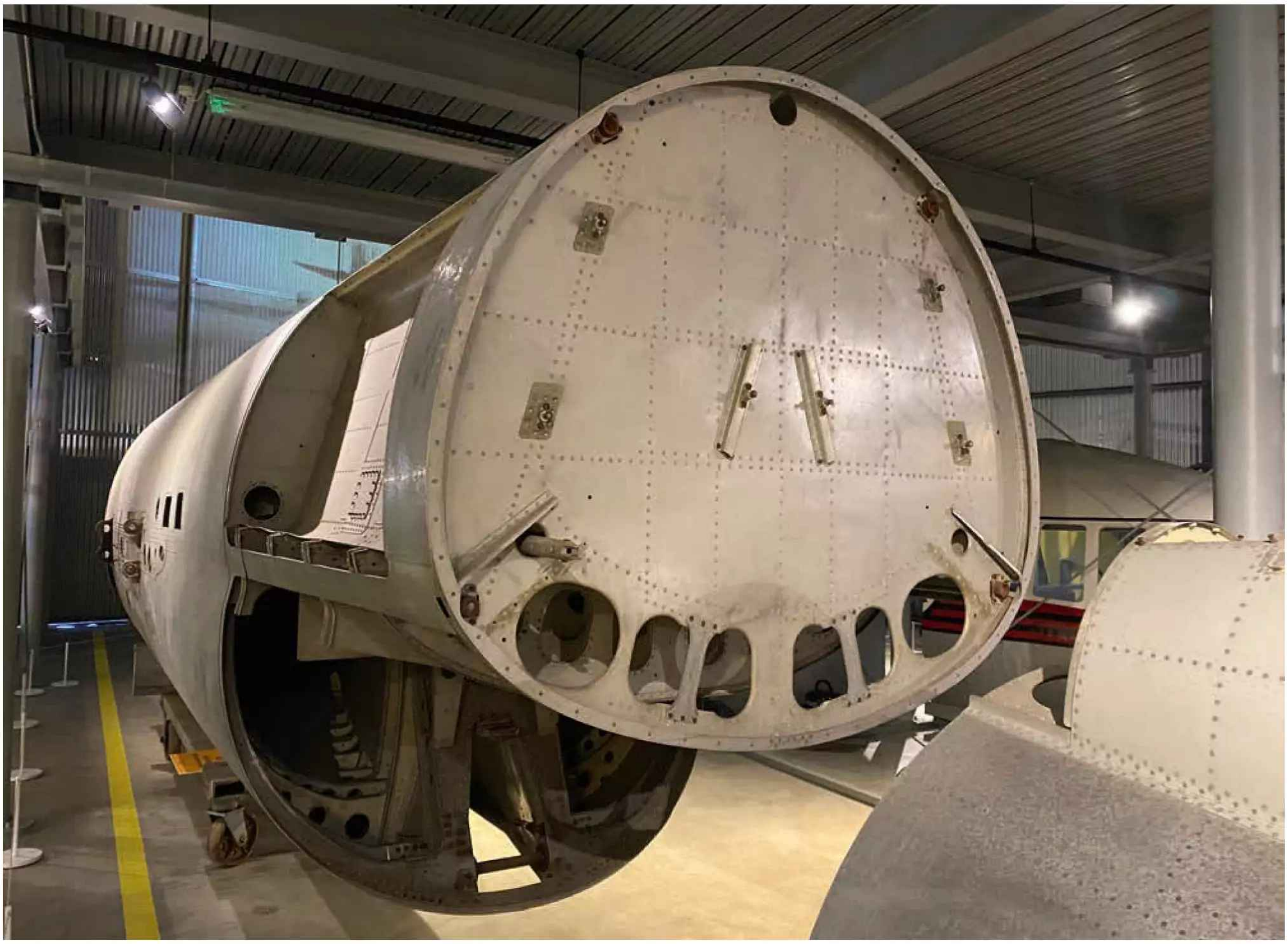
Corroded Comet must now remain wingless

The large-scale relocation of airframes at the RAF Museum Midlands in Cosford involved moving the de Havilland DH106 Comet 1XB G-APAS on September 9 to its new home at St Athan's South Wales Aviation Museum. Unfortunately, during the move to Wales – which included removing the wings from the fuselage – severe corrosion was discovered, meaning they cannot be reattached to the fuselage. The sad consequence of this enforced move is that there will never be a fully complete early Comet on display in the UK.

World's oldest Corsair back in the air at Chino

The Planes of Fame Air Museum's Vought F4U-1A Corsair BuNo 17799 returned to flight on September 23 at Chino, California. The Corsair had undergone two years of restoration work and is now the world's oldest surviving flying example.

Surviving parts of Hawker's supersonic multi-role fighter on show at Brooklands



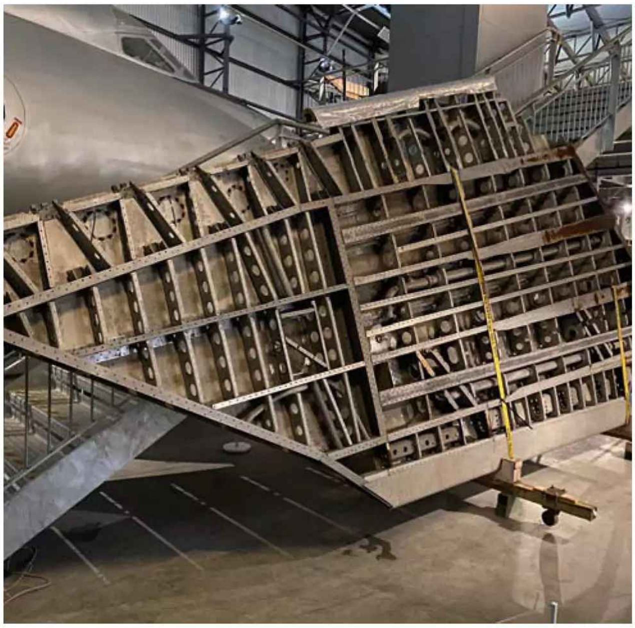
Looking towards the front of the P.1121 fuselage shows how large the multi-role fighter would have been in service, with a fuselage length of 66ft 6in (20.27m).

Now on display at the Brooklands Museum within the collection's 'aircraft factory setting' are the components of the Hawker P.1121. Following the imminent departure of the Hawker Hunter F.51 E-412, which has been sold by its owner to its former operator, the Royal Danish Air Force, with which E-412 entered service in 1956, the space left by this aircraft is now occupied by the remaining components of the impressive P.1121 prototype airframe. These components were previously stored at RAF Museum Midlands (Cosford) before being moved to Brooklands in November 2023. Since then, the parts have been kept off-site, undercover, pending decisions on how to proceed, including where to display this significant British aircraft and the work required on the sections.

The Hawker P.1121 was planned to be one of the first British-built supersonic fighters, with a projected speed of Mach 2.5. It was designed not only as a radar-equipped interceptor but also to perform ground-attack missions, potentially including tactical nuclear weapons. It would have been one of the earliest multi-role aircraft to enter service. The P.1121 was to be powered by a single de Havilland Gyron turbojet, and lead designer Sidney Camm believed this engine was the most suitable at the time. However, options such as the Rolls-Royce Olympus turbojet and the Rolls-Royce Conway turbofan could have been considered.

All these possibilities were swiftly halted following the infamous 1957 Defence White Paper issued by Minister of Defence Duncan Sandys, which called for the phased-out

One of Brooklands' engineering volunteers demonstrates the scale of the P. 1121's cockpit section.

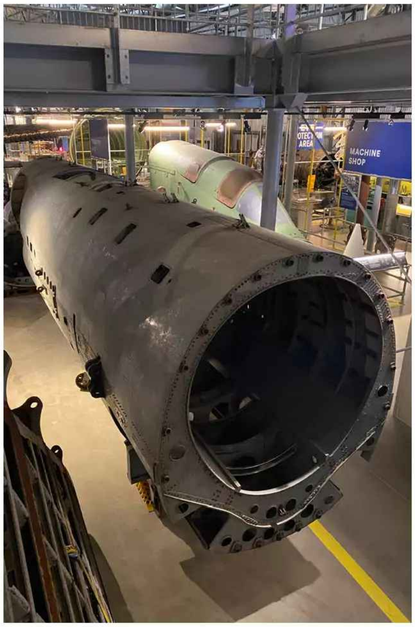


Hawker built only one incomplete wing for the P.1121 before the project was cancelled.

Despite being stored for decades in an uncontrolled temperature environment, the condition of the P.1121's components are in remarkably good shape.

of all manned fighter aircraft and their replacement with guided missiles.

With the main component now on display within Brooklands Museum's 'aircraft factory' exhibit, *Aviation Classics Monthly* spoke with David Morrison, Head of Motorsport and Aviation at Brooklands, about what's next for the P.1121 components. He explains: "We had been keen to get the aircraft, being a Hawker type, and although it wasn't built here, we're not too far from Kingston, and we already have some significant Hawker types on display. Additionally, we have a great deal of the Hawker archive here, so all the groundwork was in place to justify it coming here.



A rear view of the fuselage, showing where the de Havilland Gyron PS26-6 turbojet with reheat would have been fitted.

"Where we have now placed it within the 'aircraft factory' is beside other aircraft projects, the TSR2 nose and the P.1127, all in close proximity, which allows us to tell the stories that are connected to the P.1121 and what followed after it.

"There is a lot of history surrounding the aircraft that we can connect to how it was built, examine the engineering side, and link this to other aircraft on display, illustrating the advancements in technology from what was 'state-of-the-art' in the 1950s."

As the P.1127, later developed into the Harrier, is positioned above the P.1121, the museum can tell a fuller story of P.1121. If the latter had operational service, would the Harrier have been developed?

In terms of preserving the P.1121 components now on display, Morrison explains: "The components have had no long-term conservation work while in storage at Cosford and are on display here, as we received them. Although they are in remarkably good condition despite being stored in a covered but uncontrolled temperate environment.

"There's a little minor corrosion on the main part of the fuselage, but it has not gone very deep, and it will be quite easy to sand that back and stabilise the surface. The steel components only have surface rust, which the team of volunteers here knows how to deal with."

All this protective work is now integrated into the volunteers' planning cycle on the heritage engineering team at Brooklands. It is set to begin soon, now that the aircraft components are undercover, accessible, and all in one place. The first task, as explained, is to conduct a thorough assessment. Morrison adds: "The three parts are quite open and now accessible, and there isn't much to the structure, in the way the cockpit has been fitted out. It will be a matter of cleaning back the surface mostly to protect it for the future."

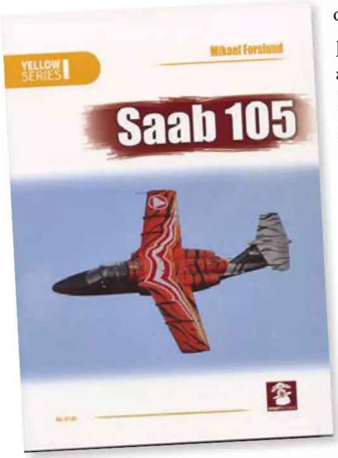
Regarding the display of the components, it is still under decision, but Morrison states: "There are two options we are considering. One is to display it for the enthusiast who is already aware of what they are looking at, including the P.1121's history. The other option is to provide enough information for non-aviation experts who might not initially understand what they are viewing.

"So, we need to have something to show them what it would have looked like if finished and what its operational role would have been. It's about improving visitors' understanding of the P.1121 while they're at the museum.

"Should we connect the front and mid-sections or keep them separate so you can see the structure inside? In terms of conservation, I think we'd be looking at the lightest touch we can."

All images credit: Glenn Sands

Saab 105



This long-overdue title discusses an aircraft that has been long overlooked by publishers, perhaps because it comes from an aircraft manufacturer that has always followed its own development path and has mainly been operated by an air force that has promoted familiar types from US and Western manufacturers to support its own aviation industry. The Saab 105 has been the backbone of pilot training for the Swedish Air Force, and to a lesser extent, the Austrian Air Force.

However, within each country, the type has always been more than just a simple jet trainer, leading to various specialised variants used for light ground attack, reconnaissance, advanced training, and liaison duties.

The extensive range of specialised roles of the Saab 105 is thoroughly covered in this book, offering impressive detail. It includes numerous line drawings and technical illustrations, along with some striking colour profiles that depict the aircraft's entire operational history. Fortunately, it also features some of the magnificent display team's schemes and Tiger Meet liveries that the 105 has worn during its service.

Although this series of books is aimed at aircraft modellers, it offers much more and will delight any aviation enthusiast with its detailed knowledge. The 296 pages feature an extensive collection of black-and-white and colour images, many of which were new to me.

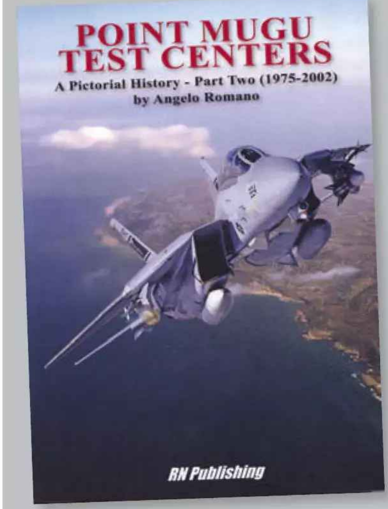
A highly recommended book on a overlooked aircraft, covered in exceptional detail.

Glenn Sands

Saab 105 – Yellow Series
By: Mikael Forslund
Pages: 296
Publisher: MMP Books
ISBN: 978-83-67227-42-1
Price: £30.00

Point Mugu Test Centers

A Pictorial History – Part Two (1975-2002)



As a huge fan of US Naval aviation, before everything turned dull grey and monotonous in colour, I had been eagerly awaiting Part Two of this series since it was first announced, and it does not disappoint. The author's attention to detail and aircraft listings is exceptional and will keep dedicated enthusiasts engaged for weeks.

Cleverly organised by aircraft types that served at Point Mugu during various test duties, the author provides extensive information on each aircraft, accompanied by a collection of images, most of which have not been published in print before.

The work at the test site itself has been analysed in detail over the years, considering not only the aircraft involved but also what was being tested, the types of sorties flown, and numerous supporting technical drawings, many from official sources, as well as maps showing where the flights took place.

Like many USN enthusiasts, I was eager to explore the roles of the F-8 Crusaders and F-14 Tomcats at the test centre, which operated from 1975 to 1980 and 1986 to 1996, respectively. The level of detail and information provided is unmatched. From the BuNo on the airframe, the period at the centre, to the date of the last flight, each aircraft is listed, supported by a wealth of colour images, many of which have not been published before. Any change in markings during a Crusader's or Tomcat's time at the centre is reflected in the artwork illustrating the evolving tail markings the aircraft wore during their test duties.

I cannot recommend this title enough, and when paired with the earlier volume one, the set is unlikely to be surpassed in the information it offers to the reader.

Glenn Sands

Point Mugu Test Centers
A Pictorial History –
Part Two (1975-2002)
By: Angelo Romano
Pages: 240
Publisher: RN Publishing
ISBN: 978-88-95011-38-7
Price: £55.00

English Electric Lightning: Volume IV

'ENGLISH ELECTRIC'
Lightning
VOLUME IV
IAN BLACK

Few Cold War-era aviation enthusiasts will have missed the stunning images captured by Ian Black during his career flying RAF Lightnings and later Tornado F3s. His air-to-air photographs have appeared on the covers of numerous magazines and articles, many of which he authored himself.

This latest tribute volume on the English Electric Lightning, published by Ian's own company—a decision made years ago to ensure the best page layout for his images—continues his impressive work with a striking collection of black-and-white and colour photographs that span the entire history of the Lightning, mainly in RAF service. While there is a nod to those who flew with Saudi Arabia, the focus of this book remains on RAF operations.

Beginning with the development and flight testing of the P1B, later known as the Lightning, this detailed account is accompanied by a remarkable collection of period images, many of which were sourced from contacts the author asked to access their private archives to illustrate this chapter.

But it's the remarkable collection of colour images that forms the heart of this title, and there's plenty to satisfy a Lightning enthusiast. I was pleased to see XR754, the grey-schemed F6 that sported a shark's mouth marking when at RAF Binbrook towards the end of its service. Only a few will be familiar to Lightning fans, and unlike many aircraft enthusiasts, I greatly admire those aircraft that wore the camouflage grey and green schemes from the 1980s onwards.

The author has once again produced an outstanding book on the Lightning, and few would have a greater knowledge of the aircraft. Ian, when you're ready, could we look forward to Lightning Volume Five next year?

Glenn Sands

Thanks to The Aviation Bookshop for the review copy.

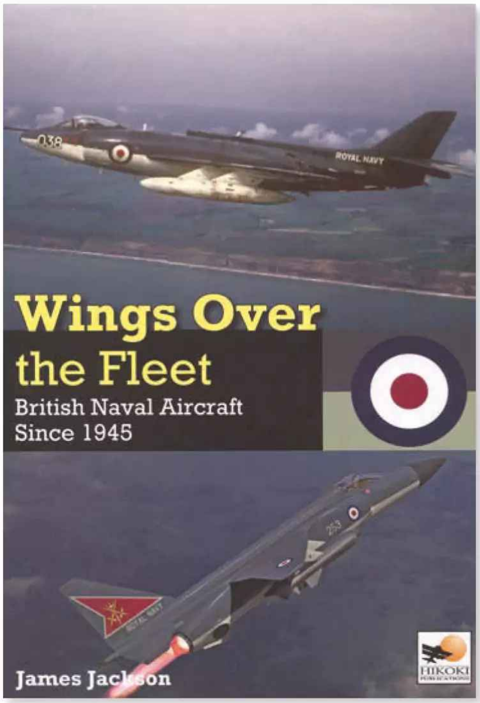
English Electric Lightning Volume IV
By: Ian Black
Pages: 168
Publisher: Firestreak Books
ISBN: N/A
Price: £37.99

Wings Over the Fleet

British Naval Aircraft Since 1945

After the end of the Second World War, the Royal Navy possessed the second-largest fleet of aircraft carriers in the world. It achieved the world's first carrier deployment and operation, including the first jet-powered aircraft landing and take-off from a carrier deck. As technological advances were made and new aircraft types and roles were introduced to the air wing, the Fleet Air Arm (FAA) remained at the forefront, with numerous types entering service along with many other proposals that were never to be launched from the drawing board.

Given the extensive roles a carrier wing must undertake at sea, the author has done an impressive job of compiling a wealth of official documents and proposals, as well as covering some of the better-known types that served with FAA squadrons over the years. There is plenty of information within the cover that was new to me, including the quite elegant Vickers Type 582 twin-fuselage strike aircraft, which was also proposed as an AEW platform, complete with SLAR antennas on the fuselage sides for deck operations.



The author has carefully explored every aspect of this subject, with each type included—whether it entered service or stayed in the manufacturer's design department—thoroughly documented using numerous photographs, line drawings, and specification tables. An excellent piece of work. Highly recommended.

Glenn Sands

Wings Over the Fleet British Naval Aircraft Since 1945
By: James Jackson
Pages: 400
Publisher: Crecy
ISBN: 978-1-80035-334-3
Price: £34.95

A Focke-Wulf Fw 190 lies broken and upside down amidst the wreckage surrounding the Reichstag building in Berlin. Several units operated the fighter during the city's final defence..

Last defence of the Reich

The final years of the Second World War saw the Allies land in Normandy and advance eastward, while the Soviets pushed the battered German armies west. Defending the Reich in the air was the role of the Focke-Wulf Fw 190, but the 'Butcher Bird', was now overwhelmed and outperformed. Nonetheless, it continued to fight in the last fierce and desperate air battles of the war.

During the spring of 1943, as both American daylight bombing and British night bombing intensified, the Luftwaffe came under increasing pressure to prevent it.

Although effective tactics had been developed that enabled the Fw 190 to engage American B-17s and B-24s, the RAF's bombers proved more difficult to intercept. When flown in a single formation, it was impossible for German controllers on the ground to direct twin-engined two-seater Messerschmitt Bf 110, Junkers Ju 88, and Dornier Do 217 night fighters onto individual targets.

Furthermore, from April 1943, the British managed to jam the German Lichtenstein B/C radar and subsequently the C-1 that followed. As the 'battle of the beams' continued, with both sides striving to improve their radar and radar jamming technology, German night fighter production failed to keep up with the vast number of bombers the RAF could deploy night after night.

An innovative solution was devised by Luftwaffe pilot Oberstleutant Hans-Joachim Herrmann. He believed that single-seat day fighters, working closely with searchlights and flak on the ground, could be sent up individually at night to spot enemy bombers visually. This, he thought, would not be too difficult when facing a large formation.

The Fw 190 was his weapon of choice for these operations, which were dubbed Wilde Sau or 'wild boar'. An improvised unit was established, Nachtjagdversuchskommando Hermann, from April 20-22 and pilot training commenced. The first major Wilde Sau operation took place on July 3, 1943, over Köln.

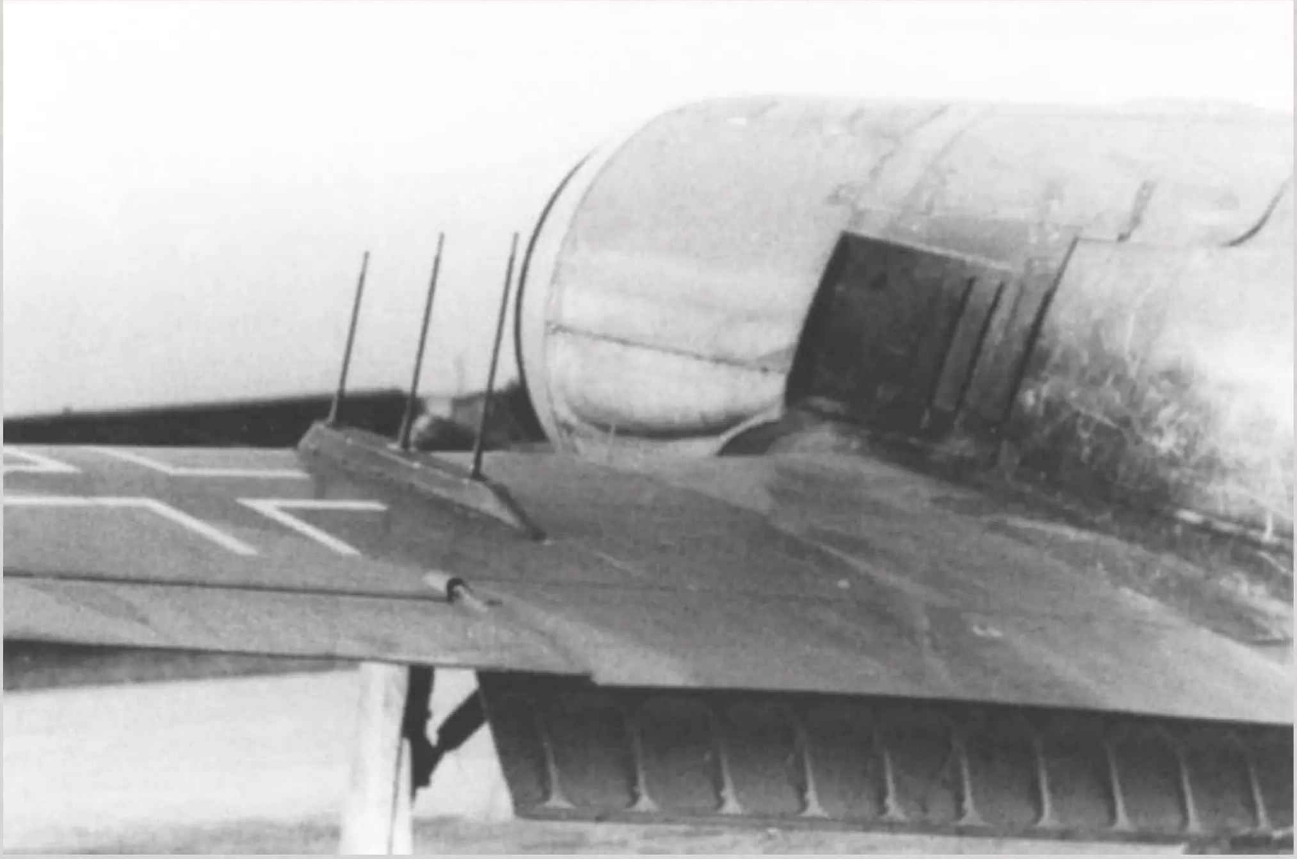
The flak and searchlights completely ignored their instructions, indiscriminately illuminating the bombers and Hermann's fighters while the flak seemed to fire at random. Nevertheless, the Wilde Sau operation successfully shot down six British bombers, including a Lancaster and a Halifax.

Now Hermann was given a mixed force of eight unmodified Fw 190s, including A-4s, A-5s, and A-6s, plus 33 Bf 109G-6s and a single Bf 109T. The unit was initially dubbed 'JG Herrmann' but renamed JG 300 on August 20, 1943. Operations ran from late July through to September 26 when two more units were formed – JG 301 and JG 302. The only Gruppe of these to fly the Fw 190, however, was II./JG 301, which shared its aircraft with I./JG 11, that used them during the day.

Flying a single-seat fighter at night without radar aid and with radio frequencies often heavily jammed was extremely dangerous and losses were high. Pilots were trained to simply bail out if they became disoriented, ran out of fuel, or suffered damage, rather than risk a crash landing in darkness.

Kurt Tank was reportedly impressed by this previously unforeseen application of his fighter and began developing a version of the Fw 190 A-6 equipped with a FuG Neptun airborne intercept radar. Successful tests were conducted with the FuG 216 Neptun V, and the aircraft fitted with it could independently detect enemy bombers in any weather.

Several of these experimental airframes were used in combat by 2./JG 2 to shoot down multiple Halifax bombers in



Fw 190 A-6 WNr. 550143 'White 11' fitted with the FuG 217 Neptun radar – its aerials extending from both wings and the fuselage fore and aft of the cockpit. The radar was an attempt to further enhance the aircraft's effectiveness during Wilde Sau night fighter operations, but few saw service.

November 1943. In December, a Fw 190 A-5, WNr. 181703 CI+PU, was fitted with the FuG Neptun 216 R tail warning radar.

'Big Week'

A new air fleet, Luftflotte Reich, was established on January 1, 1944, comprising Fw 190-equipped Gruppen of JG 1, JG 11, JG 300, and JG 302. Four days later, JG 1 and JG 11 engaged the Eighth Air Force's heavy bomber formations and their fighter escorts, attacking targets across both France and Germany.

Further raids occurred on January 7 and 11, but the largest was on January 29, when over 800 bombers and 630 fighters targeted Frankfurt. Fw 190s from I./JG 26 and II./JG 26 intercepted them over France both en route to and returning from the target, claiming to have destroyed just 11 B-17s, five B-24s, and five fighters. Three Fw 190 pilots were killed.

Further raids followed, and on February 19, the Americans launched 'Big Week' or Operation Argument. This involved 1000 bombers and hundreds of fighters – every operational fighter available to the Eighth and Ninth Air Forces.

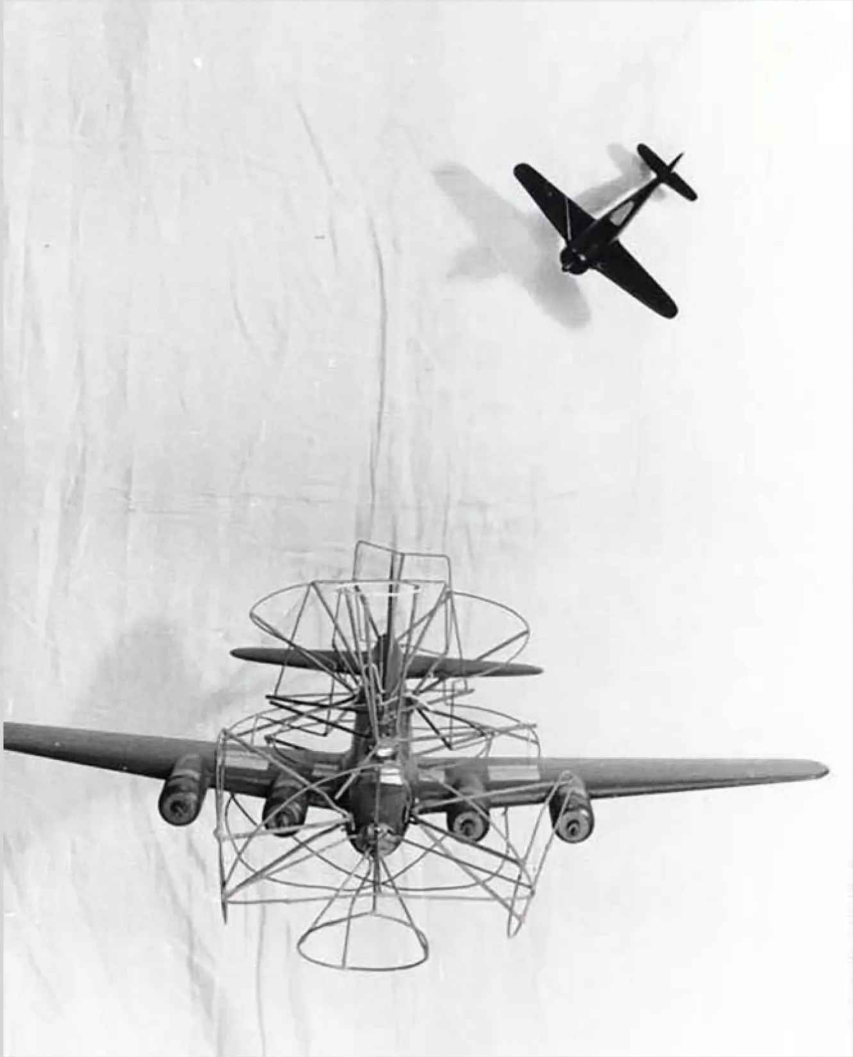
The goal was to cripple the German aircraft manufacturers, and targets included the works of Arado, Heinkel, Erla, Junkers and Ago.

The following day, over 860 bombers targeted more factories, and this time Luftwaffe airfields were also struck. The bombing continued until February 25 with a final attack on Messerschmitt's factories at Augsburg and Regensburg.

'Big Week' did not have the overall impact that the Allies had hoped for, and although German aircraft production was affected for a few weeks, by late March 1944, most of the damage had been repaired. The German fighter force, on the other hand, had not fared well. Around 240 pilots were killed, and another 140 had been wounded across all units.

There was no time for reflection, however, as the Americans next turned their attention to attacks on the German capital, Berlin. The city was bombed by 730 B-17s and B-24s on March 6, escorted by 801 fighters, and a total of 345 civilians were killed. The Americans, however, paid a high price for this attack, with 69 bombers shot down, a staggering 347 damaged and 11 fighters destroyed.

The Luftwaffe believed it had inflicted a telling blow on the enemy, but two days



A Luftwaffe training model demonstrates the B-17's fields of fire and how a Fw 190 might approach without being shot down. Preventing American and British bombers from causing major disruption to German industry was a key aim for many Fw 190 units during the final year of the war.

Josef 'Pips' Priller poses with his BMW 335 in front of one of his many Fw 190 'Black 13' aircraft in 1943. A year later, his was one of the few Luftwaffe aircraft to attack the invasion beaches on D-Day – June 6, 1944.

later, there was another attack on Berlin, this time with a depleted force of 470 bombers but 891 fighter escorts. On March 18, there was a large-scale bombing raid on airfields in the Munich area, and I./JG 11 managed to destroy 10 B-24s without losing a single Fw 190.

The Fw 190 units continued to score victories, but it was clearly not enough, since the Americans were able to replace every lost aircraft and crew with another in a matter of days.

The end of May saw Allied bombers hitting targets up and down the French coast in preparation for Operation Overlord.

Battles over the beaches

With the carnage going on over Germany and on the Eastern Front, the Luftwaffe in France had been thoroughly drained of its strength by June 6, 1944. JG 2 and JG 26 could boast just 92 serviceable fighters when the Allies began their landings at Normandy – 79 of them Fw 190s and the rest Bf 109s.

Ground-attack, fighter-bomber and night fighter Fw 190s amounted to another 37. The first Fw 190 victory of D-Day came when Hauptmann Helmut Eberspächer of 3./SKG 10 shot down four Avro Lancasters of 97 Squadron just after 5.00am.

Four hours later, Oberstleutnant Josef Priller and Unteroffizier Heinz Wodarczyk of Stab/JG 26 flew over Sword Beach in Fw 190 A-8s. On seeing the hundreds of vessels arrayed before him, Priller reportedly said: "What a show! What a show!" The pair famously made a single strafing pass before fleeing into the clouds as dozens of anti-aircraft guns opened fire on them.

Half an hour later, I./JG 2 Fw 190 A-8/R6s attacked landing craft at low level with under-wing WGr. 21 rocket tubes. Starting the day with around 14 serviceable aircraft, I./JG 2 ended it with just three. Units from Germany began moving to France to cover ground forces attempting to contain the landings, but these suffered too, with III./SG 4 losing four aircraft while moving to Laval.

Fighter units equipped with the Fw 190 that moved to oppose the Allies included elements of JG 1, JG 3, JG 11, and JG 54. Attempts to engage the British and Americans were hampered by ongoing air raids on their airfields, which often damaged the Fw 190s despite their dispersed positions.

A few days later, 7./JG 51 also moved to France from Russia, having been freshly re-equipped with Fw 190 A-8s.

Leutnant Günther Heckmann of 7./JG

51 described the situation his unit found on arrival: "We quickly learned the rules for survival in Normandy. Mustangs and Thunderbolts continually circled and dived as soon as they saw their prey. The only way to escape them was to bank and engage them in a turning dogfight."

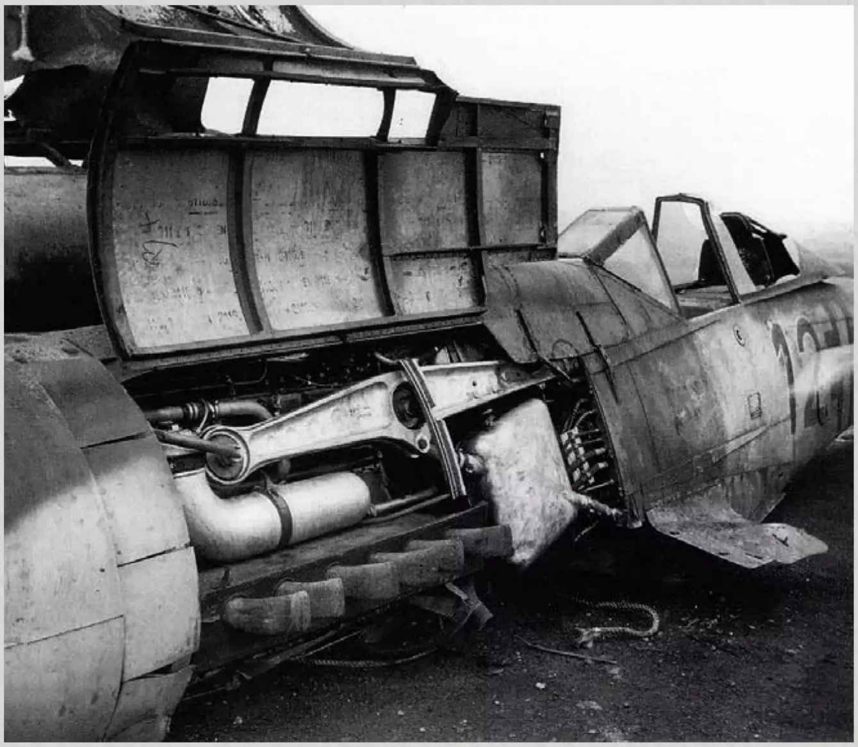
After the Americans achieved a breakthrough with Operation Cobra on July 27, German forces began a general retreat from western France and the exhausted fighter units were removed from the front line, one at a time, for rest and re-equipment at bases in Germany. Another two Fw 190 Gruppen were formed at the end of the month when heavy fighter units I. and II. ZG 26 were redesignated I. and II./JG 6 and began conversion to the Fw 190 A-8.

It proved longer than expected to bring the various Fw 190 units back up to strength however, and JG 6 was not ready for action until August 22, when II./JG 6 was finally transferred to its new base at Reims in eastern France. During its first operation, on August 25, its 40 Fw 190s ran into a large formation of P-38 Lightnings from the 367th Fighter Group. In the ensuing melee the Germans came off substantially worse, with 16 Fw 190s being destroyed compared to 11 P-38s.

When the Operation Market Garden landings took place in Holland on September 17, 1944, the two closest Fw 190 units, I. and II./JG 26, tried to intercept the waves of transports and gliders as they made for the drop zone, but were headed off by RAF Spitfires and USAAF Mustangs. On the last day of the action, September 27, 1944, I. and II./JG 26 shot down five Spitfires, but lost six Fw 190s.

During late September and early October, the first Fw 190 A-9s and D-9s were introduced, and the Wilde Sau night fighter Gruppen of JG 301 began converting from the Bf 109 to Fw 190 A-8s, which by now were being churned out in prodigious quantities.

While the units that received it regarded the Dora 9 as a new and more powerful version of the Fw 190, Focke-Wulf viewed it as an unfortunate compromise, brought about by necessity rather than any particular desire to see the Fw 190's lifespan prolonged. Chief designer Kurt Tank had his heart set on introducing the Ta 152, but this goal was slipping away from him.



Among the German aircraft lost during Operation Bodenplatte was this Fw 190 D-9, 'Black 12'. It was flown by Leutnant Theo Nibel of 10./JG 54 as he strafed the airfield at Grimbergen when a partridge went into his radiator. The damage forced him to make a belly landing, and the British captured his aircraft. It is pictured here at Farnborough after the war.

Operation Bagration

Just over two weeks after the beginning of Operation Overlord on the French coast, the Russians launched their largest offensive to date on the Eastern Front. Operation Bagration began on June 22, 1944, and this time it was the Germans who were caught unprepared.

The overwhelming force of Bagration was as astonishing as it was unforeseen when it struck Army Group Centre. The supply chain sustaining frontline German units with food and ammunition was cut off during a concentrated bombing offensive. The Soviet Air Force deployed hundreds of aircraft – swarms of fighters and fighter-bombers unlike anything seen before.

With units transferred to the west to fight the Allies in Normandy, Luftflotte 6 had 173 Fw 190s for defence – but only 17 of these were dedicated fighters, the rest being fighter-bombers. These suffered heavy losses as they were called upon to act as fighters to prevent wave after wave of Il-2s from destroying German ground forces.

By the second week of July, Army Group Centre was disintegrating, and another major assault was underway in Ukraine, which the Luftwaffe was again ill-equipped to deal with, resulting in significant losses to the Fw 190s of II./SG 2, II./SG 10, SG 77 and 1./NAGr 32.

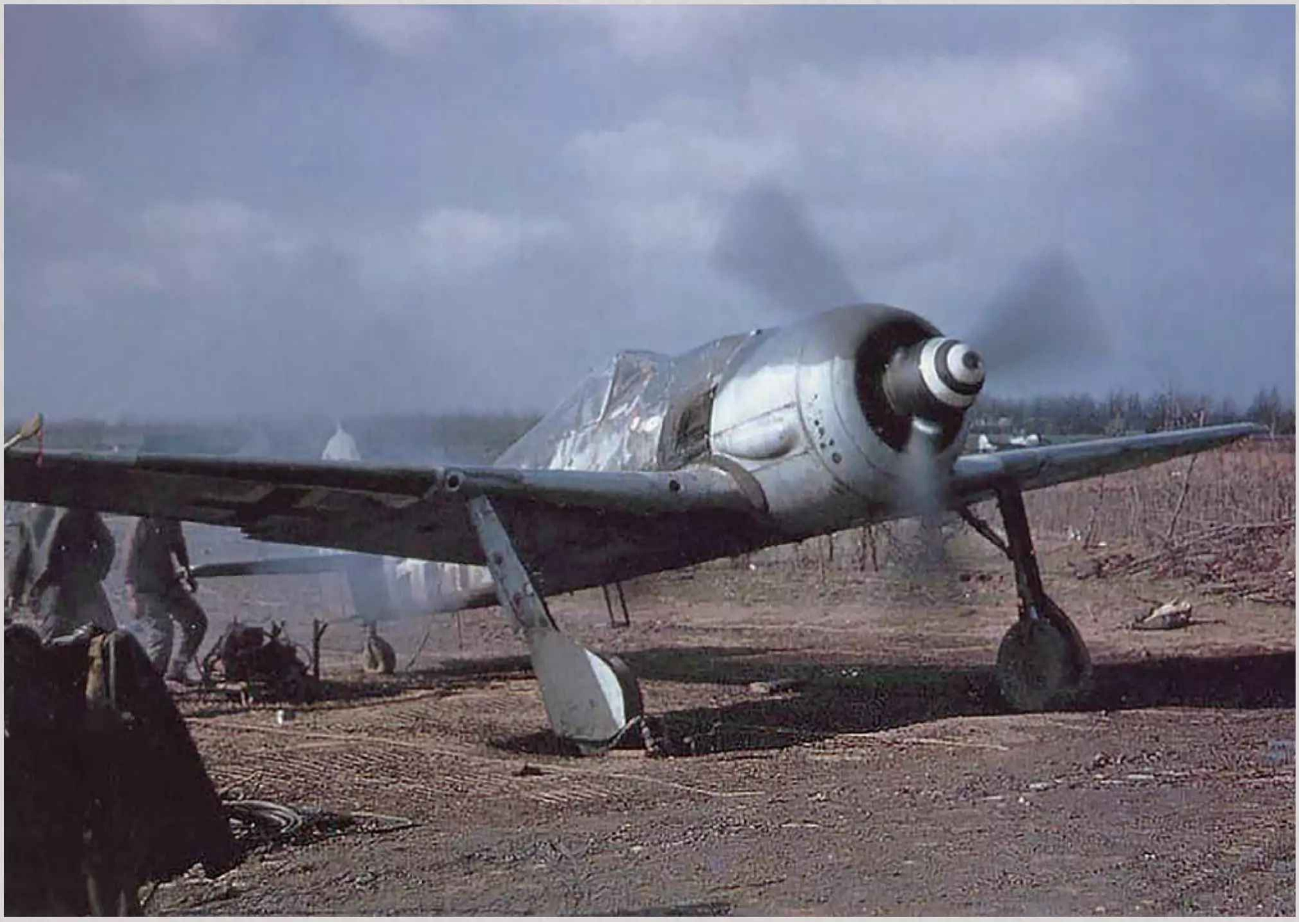
Critical fuel shortages, due to the ongoing American campaign to destroy Germany's oil refineries, also meant that the number of sorties that could be flown, even when serviceable aircraft were available, had to be limited.

Nearly all available Fw 190 fighter-bomber units, including SG 1, SG 2, SG 3, SG 4, SG 10, and SG 77, had been transferred to the Eastern Front by September 1944, as it was recognised that the Soviets now posed a greater threat than the Western Allies.

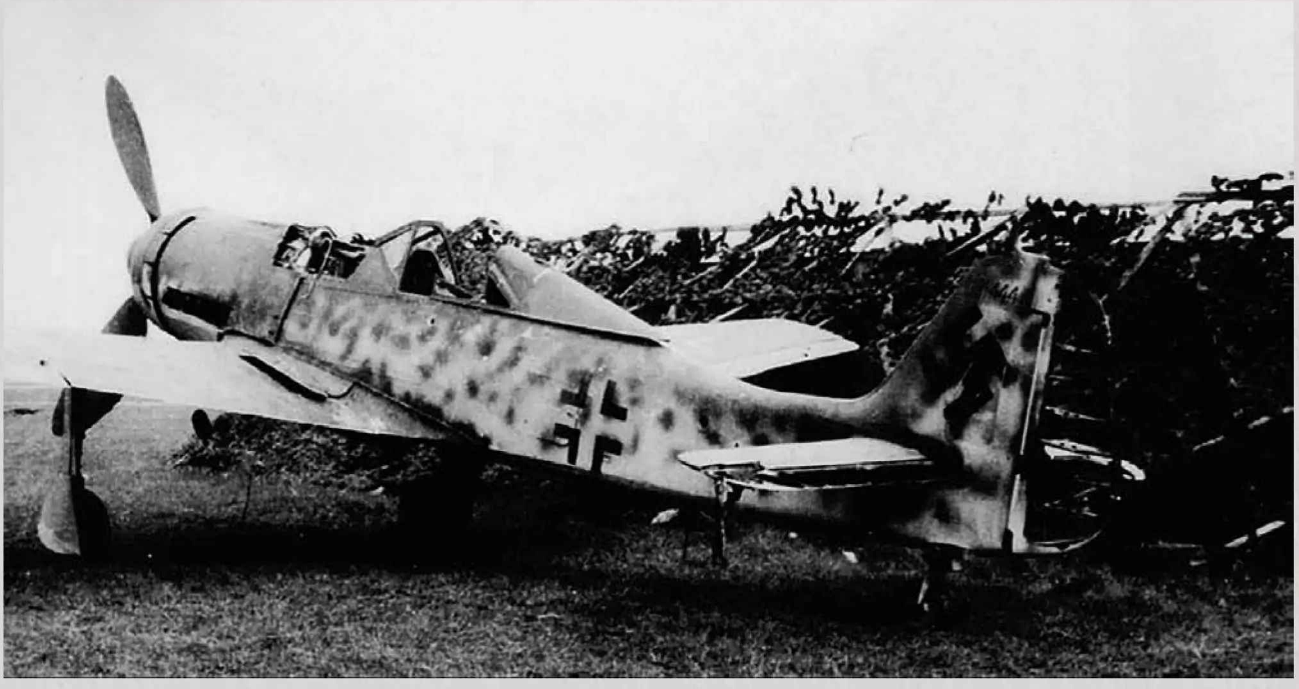
Courland Pocket

By mid-October, the Soviets had captured the headquarters of the 3rd Panzer Army and pushed as far as the Baltic, isolating what was left of Army Group North and Luftflotte 1 in the northwest of Latvia – an area later called the Courland pocket.

Among the units operating the Fw 190 in the area were II. and III./SG 3 in their ground-attack role with the fighters of I. and II./JG 54 engaging Soviet single-seaters and bombers alike. Ferocious battles were fought over and around the pocket, with the two fighter Gruppen shooting down 31 enemy aircraft on October 9 alone.



Walter Wagner's Fw 190 A-8 was hit by flak while attacking St Trond airfield in Belgium on January 1, 1945, during Operation Bodenplatte. Wagner made an emergency landing after his engine failed and was captured. American engineers repaired his A-8's engine and ran it for the camera – all its weapons have been removed.



As the Allies advanced eastwards, they captured an increasing number of aircraft abandoned by the Germans. This Fw 190 D-9, WNr. 631444, was photographed at Eschwege near Kassel, Hesse, Germany, in April 1945.

A Fw 190 A-9 from II./JG 4 at Delitzsch, south-west of Berlin, during 1945. Previously a Sturm unit, II./JG 4 fought until the end of the war, taking part in the final desperate battles to defend the Reich against both the Allies and the Soviets.

When the Allies overran Lechfeld on April 29, 1945, they found, among other aircraft, a Fw 190 A-8 'White 40'.

The Russians repeatedly tried to break the pocket throughout the month, and on October 29, they launched an attack with 1,800 bombers and fighter-bombers. Even this seemingly overwhelming force failed to dislodge the well-entrenched German ground forces, however. JG 54 continued to shoot down Il-2s, Pe-2s, and Yak-9s, notably destroying 42 on December 21, 1944.

The Great Blow

On the Western Front, the German army had finally stopped the Allied advance by October, and the Luftwaffe could focus on the persistent waves of heavy bombers still regularly pounding German industry.

General der Jagdflieger Generalleutnant Adolf Galland used this opportunity to lay plans for what he called 'the Great Blow' – an attack en masse that would inflict catastrophic damage during one of the Eighth Air Force's larger bombing raids. If half of the B-17s and B-24s taking part in a 1,000-bomber raid could be destroyed, Galland reasoned, the Americans would need time to recover.

This would give Messerschmitt the time to produce large numbers of Me 262 jets and allow Focke-Wulf to finally put its Fw 190 replacement, the Ta 152, into service. By the start of November 1944, Luftflotte Reich had over 1,000 Fw 190s, mostly A-8s and A-9s, along with 56 D-9s, while the front-line units in France saw their numbers decrease accordingly. Overall, including other types, Galland had nearly 2,200 fighters ready.

Everything was ready by November 12, but then Galland was ordered to prepare these huge reserves for a new offensive on the front line to the West against British and American fighters and fighter-bombers. The General der Jagdflieger was astonished. All his units now had too many aircraft – at least 70 each – to fit onto front-line airfields, and the new pilots he had been gathering were trained to fight bombers, not fighters. So, the Great Blow never occurred, and the Luftwaffe was forced to start dismantling its attack fleet.

Watch on the Rhine and Baseplate

Leaving JG 300 and JG 301 to fight the American bombers, elements of JG 1, JG 2, JG 3, JG 4, JG 6, JG 11, JG 26, JG 54, SG 4 and NSGr 20 were moved into position to support and attack on Allied ground forces to the west.

At 5.30am on December 16, Operation Watch on the Rhine began with a massive artillery barrage along an 80-mile stretch of the Allied front line. The 5th and 6th Panzer Armies, along with the 7th Army, pushed into the line and broke through. Snowstorms grounded allied aircraft, but the German tanks kept advancing. The 6th reached Bastogne, Belgium, before Allied forces finally halted the attack.

As the month continued, the weather improved, allowing the USAAF, RAF, and Luftwaffe to resume offensive operations. The Luftwaffe then decided to launch a modified version of Galland's 'Great Blow' – Operation Bodenplatte or 'Baseplate.'

The target would be 11 Allied forward fighter and fighter-bomber airfields in France, Holland, and Belgium, rather than high-flying heavy bombers.

Some 490 Fw 190s were available for the attack. These included A-8s and A-9s from JG 1, JG 3, JG 6 and JG 11, A-8s and D-9s from JG 2 and JG 4, D-9s from JG 26 and JG 27, and A-8s, A-9s and D-9s from JG 54.

The fighters took off at dawn on January 1, 1945, and made for their targets. It wasn't quite the lightning hit-and-run strike that the Germans had intended, however.

The Allies were caught off guard, but the German fighters encountered heavy flak, fighters already in the air, and, in general, far stiffer resistance than expected. Overall, 305 Allied fighters were destroyed, most of them on the ground and without their pilots being harmed.

The Germans, however, lost 271 aircraft, including 144 Fw 190s. Their pilot losses were devastating—143 killed or missing, another 70 captured after bailing out or crash landing, and 21 wounded.

Allied manufacturing was able to make good the losses of aircraft within a matter of days, but the Luftwaffe never recovered from losing so many pilots in a single blow.

The road to Berlin

With the Russian winter finally relenting, the last great Soviet offensive of the war began on January 12, 1945, and this time there was no stopping it.

Much of what remained of the Luftwaffe's fighter strength in the west had to be hurriedly transferred to the east in an attempt to stop the Russian Il-2s from inflicting devastating casualties on the German army. Those flying the remaining Fw 190s and Bf 109s were mostly raw recruits, led by a handful of highly experienced but utterly exhausted veterans.

The Soviets reached the River Oder on January 23 – just over 50 miles east of Berlin – and by the end of the month, the Luftwaffe had lost yet another 215 fighters. When the RAF bombed Dresden on the night of February 13/14, there were few German fighters to oppose them, but when the Americans sent 311 bombers to carry out a second attack on the city on February 14, II./300 and JG 301 tried to oppose them. Neither was successful but both lost four Fw 190s. By February 25, most of III./JG 54's D-9s, protecting the Me 262s at Achmer and Hesepe, had been destroyed, and it was absorbed into JG 26.

The situation was desperate but even so, with the last of the Luftwaffe's strength now committed to stopping the Russians from crossing the Oder, it was able to gain some successes. Some 14,000 sorties were flown against the Soviets from February 1 to February 10.

As this resistance continued, the Americans reached the River Rhine to the west. Amazed to find a bridge intact at Remagen, they quickly began to bring forces across it. Twenty-four Fw 190 fighter-bombers were brought in to try and destroy it on March 9, but their attempts were not immediately successful, and the Americans had, in any case, quickly built several pontoon bridges nearby.

The noose was tightening by the beginning of April, and by the middle of the month, the Soviets had a staggering 150 divisions massed along the Oder, supported by some 7,500 combat aircraft of all types. The Luftwaffe had just over 2000 remaining and precious little fuel to put in them.

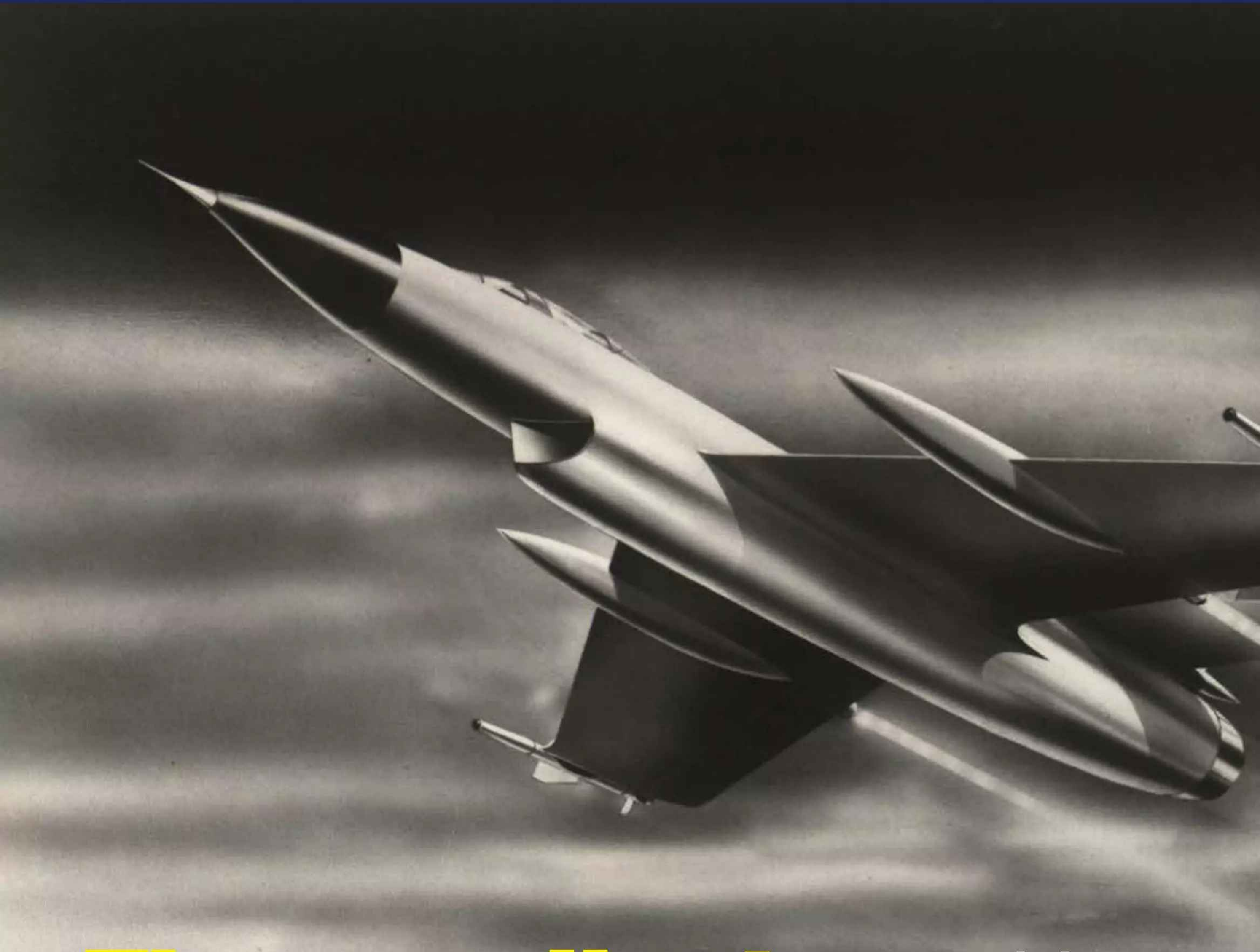
The Russian attack on Berlin itself commenced on April 16, and encirclement began on April 24. Among the Fw 190 units defending the capital were JG 3, I./SG 1 and II./SG 1.

When the Soviets finally took the city, those remaining Luftwaffe personnel with sufficient fuel left to fly their aircraft made a desperate attempt to fly westwards and surrender to the British and Americans. Others attempted to escape westwards on foot or by road vehicle. Still others had no choice but to surrender to the Russians.

The Fw 190's time in the service of the Third Reich was over.

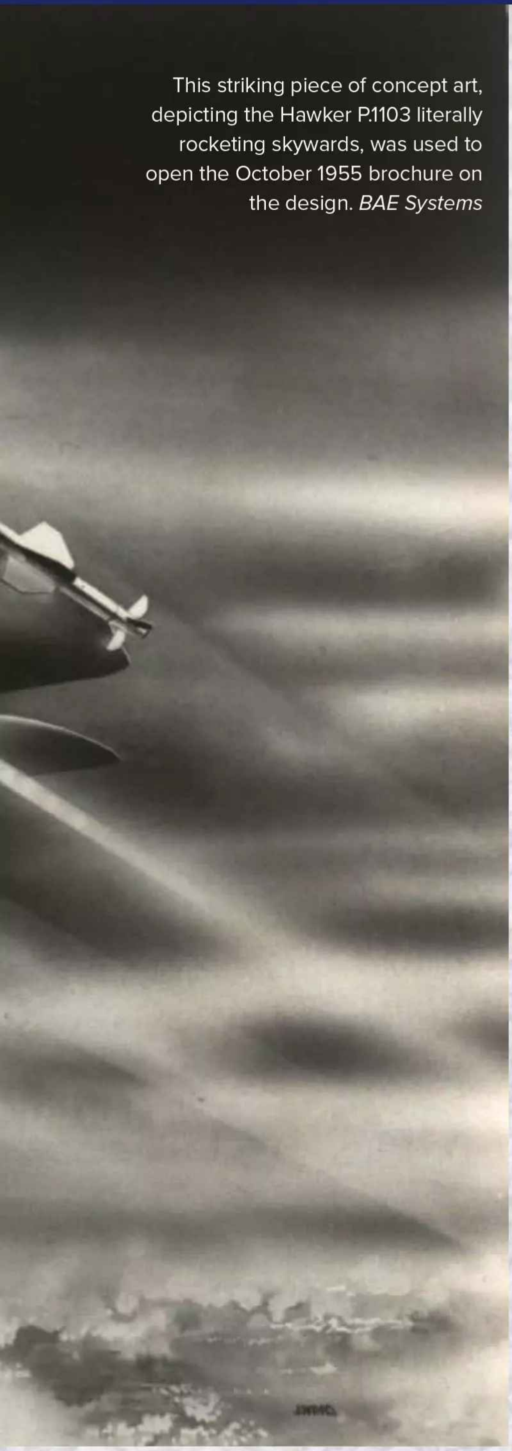
For more see:
Eagles of the Luftwaffe
Focke-Wulf Fw 190
By **Dan Sharp**
Published by **Mortons Media Group**
Price on MortonsBooks.co.uk
£12.99

1
EAGLES OF THE LUFTWAFFE
FOCKE-WULF Fw 190
DAN SHARP
EAGLES OF THE LUFTWAFFE



The smallest possible AIRCRAFT

The Hawker P.1103 was a concept developed by Hawker Aircraft to meet the British Operational Requirement F.155, which was the RAF's demand for an interceptor capable of defending the UK against Soviet supersonic nuclear bombers. This meant that performance was of the utmost importance. The Hawker design brochure paid little attention to tactics, strategy or even the 'weapons system' concept, focusing instead on increasing power and reducing weight. The result was undoubtedly a formidable combat aircraft.



This striking piece of concept art, depicting the Hawker P.1103 literally rocketing skywards, was used to open the October 1955 brochure on the design. *BAE Systems*

Hawker made no bones about it – the P.1103 was going to be relatively small, relatively light, and packing the largest, most powerful single engine that could possibly be squeezed into it.

Rather than attempting to discuss the problem of tackling Soviet bombers via a pursuit course or head-on attack, the brochure begins instead with a straightforward description of the aircraft itself: "An attempt to meet the requirements of Specification F.155T with the smallest possible aircraft is the design philosophy behind the weapon system described in this brochure. A single-engine design has been chosen, since it is the cleanest aerodynamically and has the highest thrust/weight ratio."

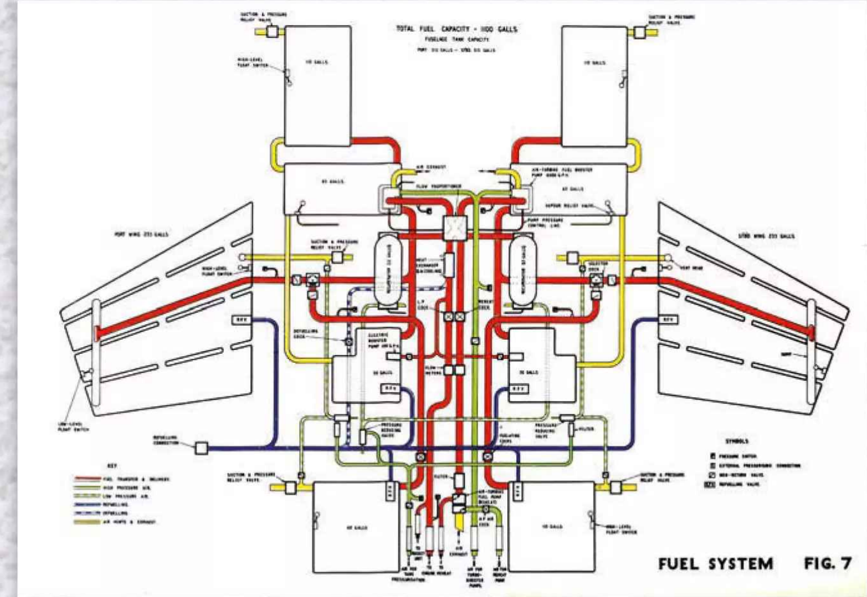
The powerplant was to be "the most powerful engine available, namely the de Havilland Gyron". Other engines were being kept under consideration however: the Armstrong Siddeley P.173, the Rolls-Royce RB.122, and the Orenda Engines PS.13. Rather than fit rocket motors internally, where they and their fuel would add weight and take up valuable space, Hawker intended the P.1103 to have aerodynamic fuel tank/motor units which could be easily put on or taken off the aircraft as required: "The detachable rocket booster units are … carried on the wings. These units are completely self-contained and hold sufficient oxidant and fuel for 3.7 minutes rocket firing time."

They were evidently also the result of some confusion about the specification. Hawker's engineers had read between the lines and thought they could discern what the Air Staff really wanted out of the F.155T aircraft – range and loiter time. It was therefore a good job that the mounting points for the rocket motors could also be used for drop tanks: "Although the Specification places particular importance on rate of climb and acceleration, it is understood that emphasis has recently swung towards increased endurance. Since there is this conflict in requirements and, indeed, the strong possibility that both characteristics will be required at different times, the rocket booster has been designed as a detachable self-contained unit, so that the aircraft is equally efficient in either role.

"An advantage of this arrangement is that rocket motors of greater thrust can be substituted and it is further suggested that the present 1,100 gallons internal fuel capacity could be augmented by carrying additional fuel in containers similar to, but in lieu of, the rocket booster units. This configuration would provide some 1,500 gallons total fuel capacity."

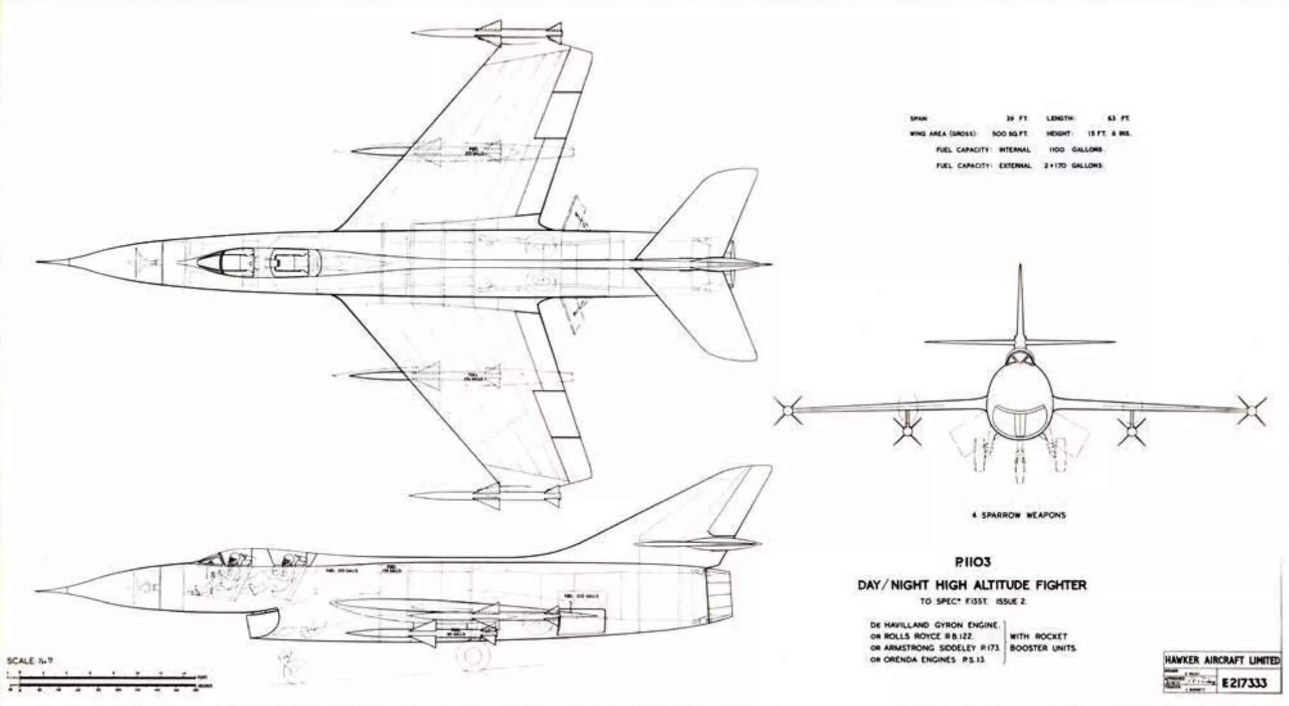
The actual motor used for the rockets would be an Armstrong Siddeley RB.6/1 rated at 2,000lb – the same as the late 1940s Armstrong Siddeley Snarler. The rockets would be controlled using "a single on-off switch mounted on the throttle handle" and the pilot would get a 'firing time left' indicator along with a warning light operated by a pressure switch connected to the combustion chamber to show when each motor was in operation.

Weaponry would consist of either two Blue Jay Mk.4 infra-red homing missiles, or a pair of Vickers "small radar missiles". Hawker accepted that the spec called for the ability to mount either infra-red or radar homers, but intensely disliked the enormous radar weapons Vickers was developing at that time, stating: "The Red Dean replacement type of weapon, as at present designed, ➤

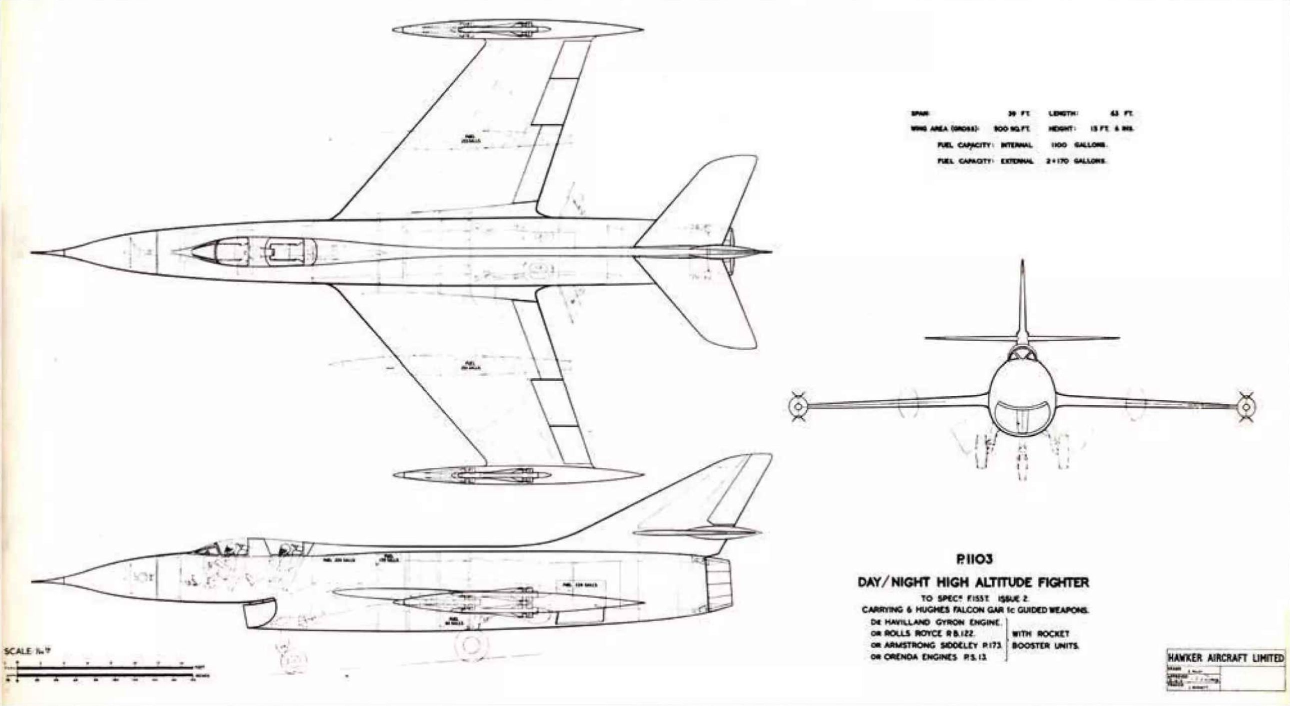


FUEL SYSTEM FIG. 7

A simple kerosene fuel system was all the P.1103 needed – because the aircraft itself was not required to house the fuel for its rocket boosters. *BAE Systems*


SPAN: 39 FT. LENGTH: 63 FT.
WING AREA (GROSS): 500 SQ.FT. HEIGHT: 15 FT. 6 INS.
FUEL CAPACITY: INTERNAL 1100 GALLONS
FUEL CAPACITY: EXTERNAL 2×170 GALLONS
4 SPARROW WEAPONS
P.1103
DAY/NIGHT HIGH ALTITUDE FIGHTER
TO SPEC^N F155T. ISSUE 2.
DE HAVILLAND GYRON ENGINE.
OR ROLLS ROYCE R.B.122.
OR ARMSTRONG SIDDELEY P.173.
OR ORENDA ENGINES P.S.13.
WITH ROCKET BOOSTER UNITS.
SCALE
HAWKER AIRCRAFT LIMITED
E217333

The P.1103 could carry four semi-active radar homing AIM-7 Sparrow missiles. *BAE Systems*


SPAN: 39 FT. LENGTH: 63 FT.
WING AREA (GROSS): 500 SQ.FT. HEIGHT: 15 FT. 6 INS.
FUEL CAPACITY: INTERNAL 1100 GALLONS
FUEL CAPACITY: EXTERNAL 2×170 GALLONS
P.1103
DAY/NIGHT HIGH ALTITUDE FIGHTER
TO SPEC^N F155T. ISSUE 2.
CARRYING 6 HUGHES FALCON GAR 1c GUIDED WEAPONS.
DE HAVILLAND GYRON ENGINE.
OR ROLLS ROYCE R.B.122.
OR ARMSTRONG SIDDELEY P.173.
OR ORENDA ENGINES P.S.13.
WITH ROCKET BOOSTER UNITS.
SCALE
HAWKER AIRCRAFT LIMITED

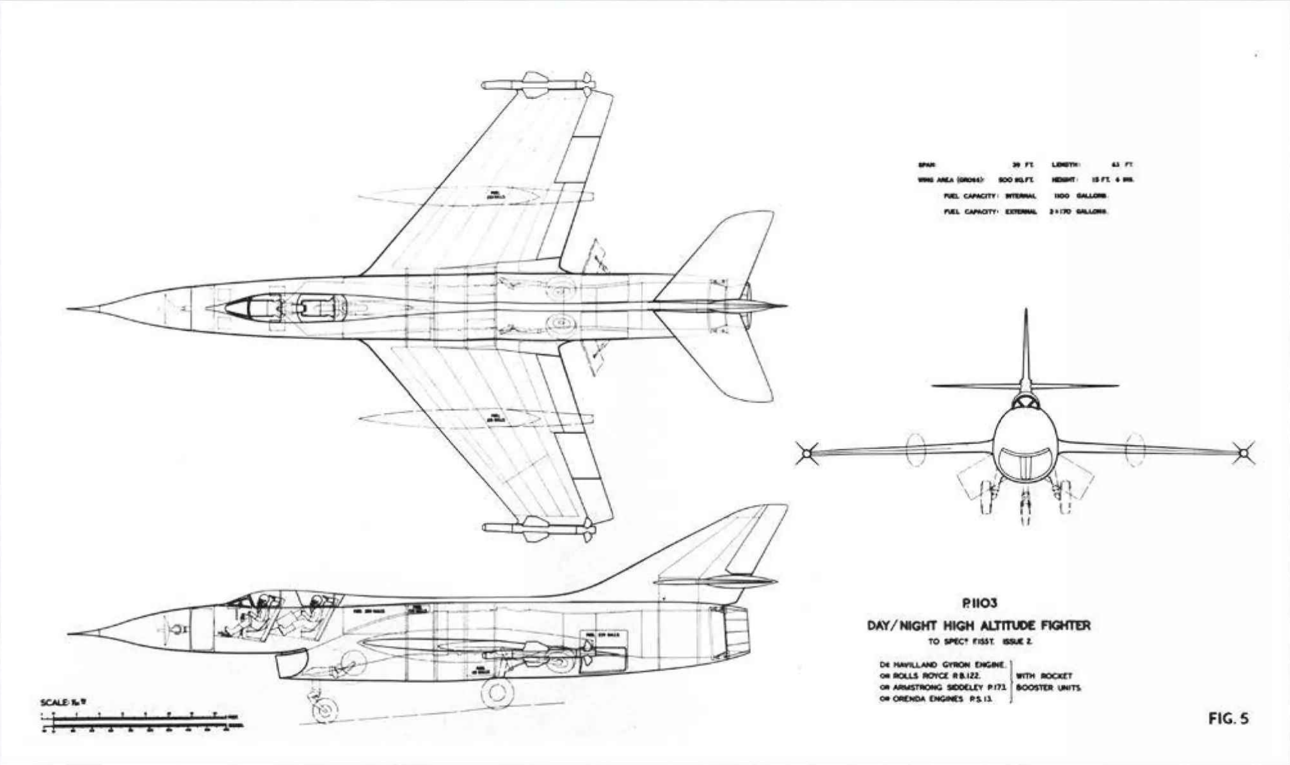
It was possible to fit the aircraft with no fewer than six Hughes AIM-4 Falcon missiles, carried in aerodynamic wingtip fairings. *BAE Systems*

is so large and aerodynamically dirty as to be completely out of harmony with this aircraft or any other aircraft on which it is mounted externally.

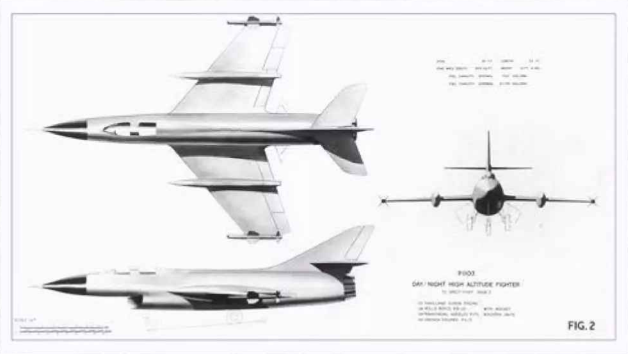
"The alternative of mounting a pair of these weapons internally or semi-internally implies a fuselage (or other container) which, in our opinion, is prohibitively large. It is strongly urged, therefore, that all efforts should be concentrated on developing Blue Jay and/or the Vickers small radar missile to perform the Red Dean mission.

"However, the weight of the Red Dean replacement missile is not excessive and it may be possible to carry a pair of these weapons on this aircraft if the severe sacrifice in performance due to their drag can be justified."

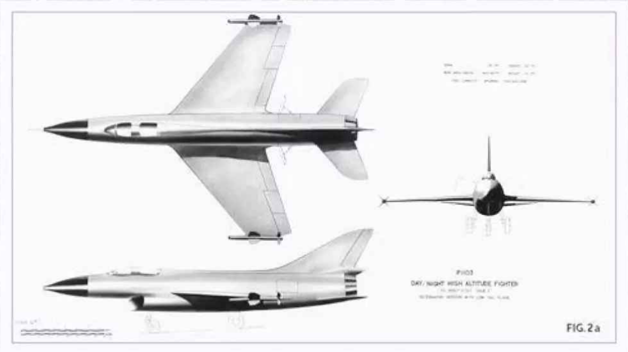
Every single drawing in the Hawker brochure which showed the P.1103 fitted with missiles depicted Blue Jays. The company had drawings prepared showing it armed with Red Hebes, Raytheon AIM-7 Sparrows, and Hughes AIM-4 Falcon


SPAN: 39 FT.
LENGTH:
WING AREA (GROSS): 500 SQ.FT.
HEIGHT: 15 FT. 6 INS.
FUEL CAPACITY: INTERNAL 1100 GALLONS.
FUEL CAPACITY: EXTERNAL 2×170 GALLONS.
P.1103
DAY/NIGHT HIGH ALTITUDE FIGHTER
TO SPECT F155T. ISSUE 2.
DE HAVILLAND GYRON ENGINE.
OR ROLLS ROYCE R.B.122.
OR ARMSTRONG SIDDELEY P.173.
OR ORENDA ENGINES P.S.13.
WITH ROCKET BOOSTER UNITS.
SCALE
FIG. 5

Every image of the P.1103 included with the F.155T tender brochure deliberately showed the aircraft armed with Blue Jay Mk.4 missiles – even though the specification asked for Vickers' radar-guided Red Hebe as an option. *BAE Systems*


P.1103
DAY/NIGHT HIGH ALTITUDE FIGHTER
FIG. 2

Toned three-view drawing of the high-tail P.1103 from the brochure. The high-tail layout was preferred over the low-tail layout presented as an alternative because it was thought to prevent pitch-up. *BAE Systems*


P.1103
DAY/NIGHT HIGH ALTITUDE FIGHTER
FIG. 2a

A low-tail version of the P.1103 was also presented in the brochure as an alternative. On paper, the only real difference in spec was a reduction in overall height by 6in, despite a taller undercarriage. *BAE Systems*

missiles, but declined to include any of them in its tender submission. However, it appears that the brochure submitted actually came complete with a small model of the P.1103. The brochure introduction noted: "Blue Jay is shown in all the pictures, but the model kit contains a set of both types of missile which can be fitted as alternatives."

So anyone interested in seeing how the aircraft might look with Red Deans had only to tinker with their model a little.

The brochure went on: "The weapons are carried externally because of the impossibility of stowing such irregularly-shaped articles within this small compact aircraft. Moreover, the carriage of the weapons externally has the advantages of simplicity, light weight, and flexibility of operation. Further, it affords the best possible field of view for the weapon sensing-heads."

The P.1103's all-up weight was given as 35,000lb or 40,000lb if the rocket booster packs were installed. The brochure goes on to comment on the P.1103's handsome shape, being evidently rather proud of it: "It is apparent from the Frontispiece and Fig. 2 (three-view G.A.) that the aerodynamic layout is conventional. A swept wing has been chosen because of its favourable transonic characteristics, load-relieving ability and structural suitability for the single-engine arrangement. The thickness/chord ratio is 5% at the root and 3½% at the tip."

Two tail arrangements, high and low, were offered but: "In our opinion an aircraft layout incorporating a high tail position can, with the aid of wind tunnel experimentation, be developed satisfactorily against pitch-up, and this position is strongly preferred from all other aspects. ➤

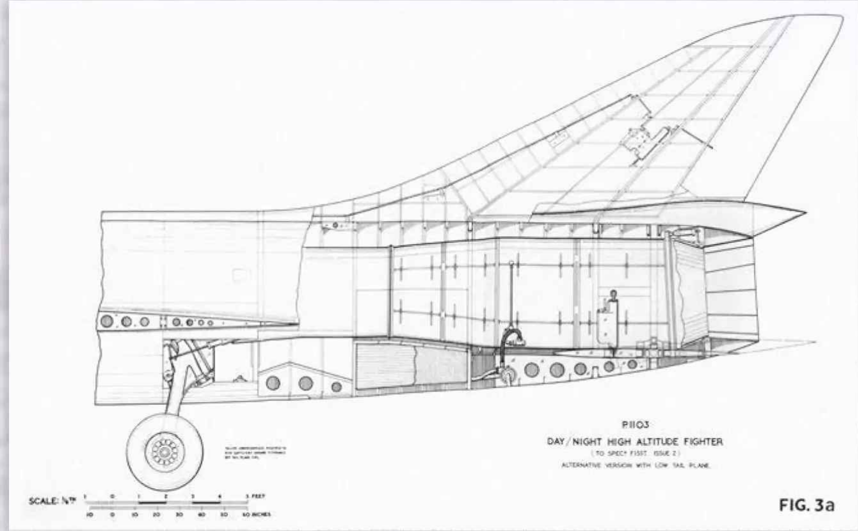
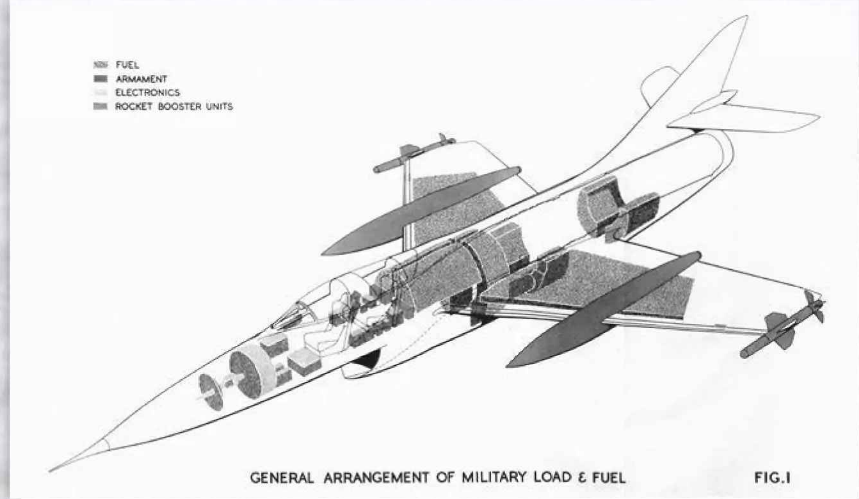

P.1103
DAY / NIGHT HIGH ALTITUDE FIGHTER
(TO SPEC F155T ISSUE 2)
ALTERNATIVE VERSION WITH LOW TAIL PLANE
SCALE
FEET
INCHES

FIG. 3a

A more detailed view of the alternative low tail version of the P.1103. As noted in the drawing in tiny writing, a slightly taller undercarriage would be required to give the tailplane tips sufficient ground clearance. *BAE Systems*



GENERAL ARRANGEMENT OF MILITARY LOAD & FUEL

FIG.1

The P.1103's clean but conventional layout belies the huge number of configurations that led up it. The fact that it resembles the hugely successful General Dynamics F-16 – designed some 20 years later – gives some indication of just how 'right' the Hawker team got it. *BAE Systems*

"An alternative low position has, however, been investigated in detail."

The pitot-static head was mounted in front of the radome, which is a common placement today. The engine's air intake included a retractable debris guard, and a fairing located at the rear of the tailplane/fin junction housed braking parachutes, which are crucial during landing: "Take-off presents no problem on account of the extremely high power to weight ratio. The landing requirement, on the other hand, is severe for this type of aircraft and in order to meet it, a braking parachute installation has been provided. Wheel brake developments are in progress to reduce the ground run as much as possible. The nose wheel is steerable, and it should be noted that the tyre pressures are 170psi."

The P.1103 would carry three 7ft diameter parachutes stowed in the fin or tailplane trailing edge bullet, assuming the high tailplane version was adopted. If the low tailplane option was chosen, a "special fairing above the reheat nozzle" would be used. Only two of the parachutes would be deployed during a normal landing, with the third reserved for emergencies, and it was possible for all three to be jettisoned.

What a performance

Having designed what they regarded as an aircraft with a winning combination of flexibility and outright performance, the Hawker team were supremely confident that it could not just meet but significantly exceed the F.155T performance requirements.

The brochure stated: "Both the Normal Warning Time and the Extended Warning Time sorties outlined in the Specification are satisfied … It should be noted that, in most cases, these sorties are achieved with a useful amount of fuel in reserve, which increases the potential endurance of the aircraft.

"The above sorties are illustrated for both versions of the aircraft with and without rocket booster units fitted. The aircraft's versatility could be still further enhanced by carrying extra main engine fuel in external tanks similar to the rocket booster units. By this means a great increase in range could be achieved should operational conditions require this.

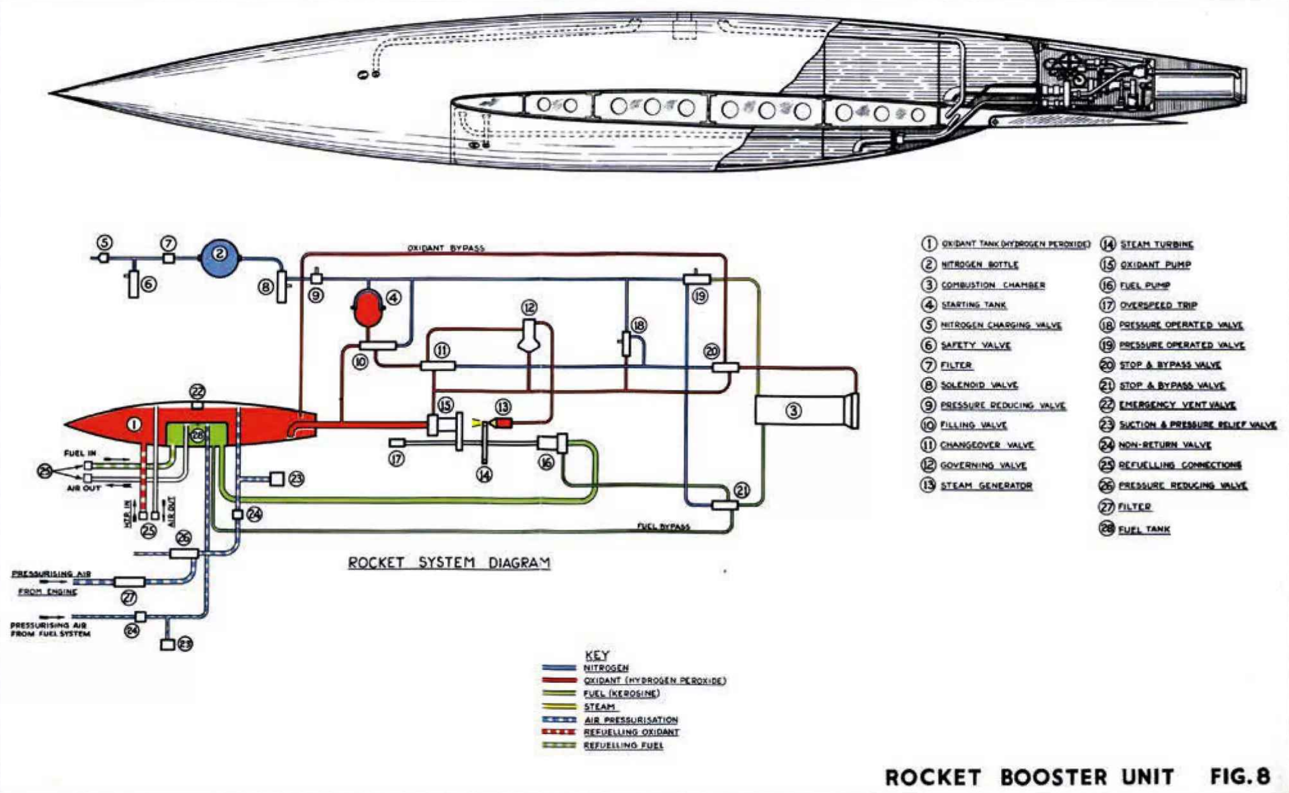
"A 1½ g ceiling of 65,000ft is achievable with the aid of the rocket boosters. The maximum rate of climb is such that from start up, 60,000ft altitude can be reached in four minutes without the use of rocket boost. If rocket boost is used, this can be achieved together with an arrival Mach number of 2.0 or more. A maximum level speed of Mach 2 is achievable over the altitude range 30,000ft to 65,000ft. Acceleration from Mach 1.3 to Mach 2 at 60,000ft, using the rocket boosters, occupies just over two minutes.

"This figure could be improved if required by employing rocket motors of greater thrust (approximately 2½ times i.e. 10,000lb rocket thrust would give one minute acceleration time from Mach 1.3 to Mach 2) but something approximating to a pro-rata reduction in rocket endurance would have to be borne.

"This is because the characteristically high fuel consumption of the rocket motor would increase the aircraft weight disproportionately such that the law of diminishing returns would predominate. However, it is possible that a compromise could be reached if the issue is vital."

In other words, bigger rocket motors would cut the time to go from Mach 1.3 to Mach 2 in half – but the cost in extra weight would be substantial – ultimately defeating the whole point of making the P.1103 such a lightweight machine in the first place.

Despite its general flexibility, the performance demands likely to be placed on the P.1103 meant that some of its specifications were significantly limited. Under the heading of 'combat radius on supersonic cruise sortie (reheat only)', the


OXIDANT BYPASS
FUEL BYPASS
FUEL IN
AIR OUT
HTP IN
AIR OUT
PRESSURISING AIR FROM ENGINE
PRESSURISING AIR FROM FUEL SYSTEM
ROCKET SYSTEM DIAGRAM
① OXIDANT TANK (HYDROGEN PEROXIDE)
② NITROGEN BOTTLE
③ COMBUSTION CHAMBER
④ STARTING TANK
⑤ NITROGEN CHARGING VALVE
⑥ SAFETY VALVE
⑦ FILTER
⑧ SOLENOID VALVE
⑨ PRESSURE REDUCING VALVE
⑩ FILLING VALVE
⑪ CHANGEOVER VALVE
⑫ GOVERNING VALVE
⑬ STEAM GENERATOR
⑭ STEAM TURBINE
⑮ OXIDANT PUMP
⑯ FUEL PUMP
⑰ OVERSPEED TRIP
⑱ PRESSURE OPERATED VALVE
⑲ PRESSURE OPERATED VALVE
⑳ STOP & BYPASS VALVE
㉑ STOP & BYPASS VALVE
㉒ EMERGENCY VENT VALVE
㉓ SUCTION & PRESSURE RELIEF VALVE
㉔ NON-RETURN VALVE
㉕ REFUELLING CONNECTIONS
㉖ PRESSURE REDUCING VALVE
㉗ FILTER
㉘ FUEL TANK
KEY
NITROGEN
OXIDANT (HYDROGEN PEROXIDE)
FUEL (KEROSINE)
STEAM
AIR PRESSURISATION
REFUELLING OXIDANT
REFUELLING FUEL

ROCKET BOOSTER UNIT FIG.8

Providing the P.1103 with detachable boosters that housed all their own fuel was one of the design's more innovative features. *BAE Systems*

brochure noted: "The effective combat radius of the aircraft, without rocket boosters, is shown to be in excess of 200 nautical miles when the speed used for pursuit and combat is restricted to Mach 1.5. This type of sortie is likely to be used only against subsonic raiders." Two hundred miles was not much of a combat radius, and it would only really be acceptable for a pure interceptor.

Furthermore, under 'combat performance above 60,000ft (reheat plus booster)', it was stated: "By carrying rocket boosters, the aircraft is shown to be capable of reaching 80,000ft in a steady climb at a speed of Mach 2. Unfortunately, the combat time remaining at this altitude is very short (one minute), and only very gentle manoeuvres are possible if speed and altitude are to be retained. However, the height advantage over a target at, say, 60,000ft, will enable a very rapid overtaking pass to be made by diving. The height limit to this steady climb is incurred by the exhaustion of the rocket fuel and not by lack of thrust."

Limited freedom

When it came to the 'weapon system' concept, Hawker struggled. Rather than even feigning an acknowledgement that a combined and integrated approach to radar, missile and aircraft could make the united trio greater than the sum of its parts, Hawker's attitude was that this simply wouldn't work in practice. It stopped short of calling the idea nonsense, but only just. Under the heading 'weapon system' the brochure said: "The components of the Weapon System which can be under the control of the aircraft designer, in addition to the aircraft automatic control system, are the weapons, the AI radar, the navigation and the radio communication equipment.

"It is agreed that ideally they should come under one authority but, in this

➤

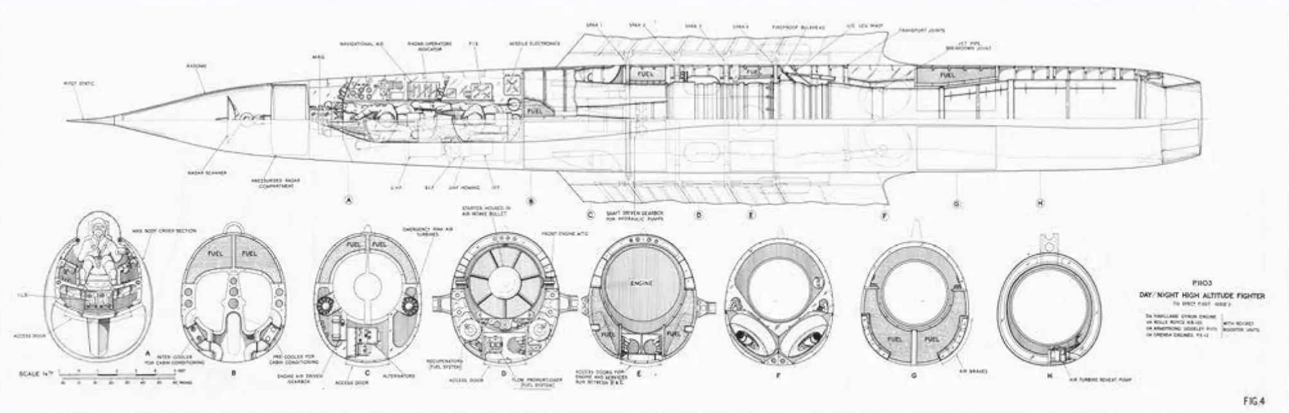
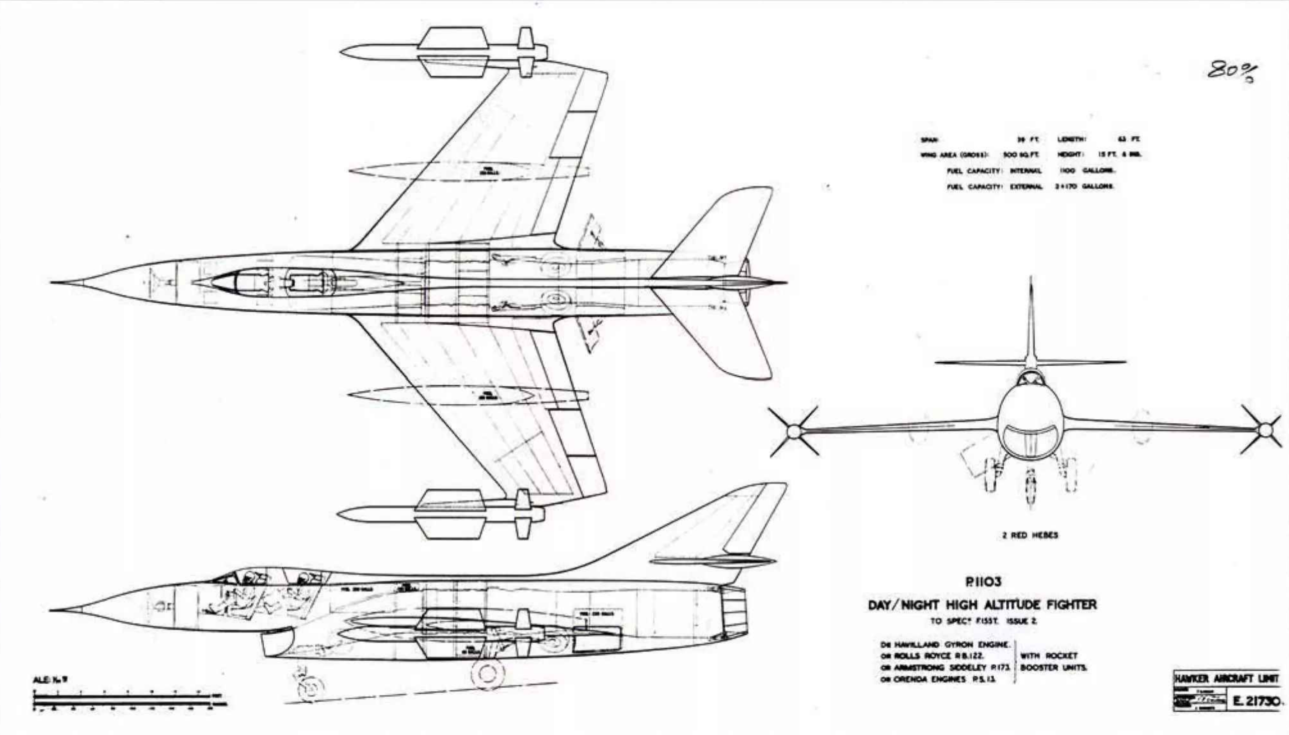

FUEL
FUEL
FUEL
FUEL
FUEL
ENGINE
A
B
C
D
E
F
G
H
P1103
DAY/NIGHT HIGH ALTITUDE FIGHTER

FIG.4

Barely an inch is wasted in the P.1103's slender fuselage. *BAE Systems*


80%
SPAN: 36 FT
LENGTH: 63 FT
WING AREA (GROSS): 500 SQ.FT.
HEIGHT: 15 FT. 6 INS.
FUEL CAPACITY: INTERNAL 1100 GALLONS.
FUEL CAPACITY: EXTERNAL 2×170 GALLONS.
2 RED HEBES
P.1103
DAY/NIGHT HIGH ALTITUDE FIGHTER
TO SPEC^N F.155T. ISSUE 2.
DE HAVILLAND GYRON ENGINE.
OR ROLLS ROYCE R.B.122.
OR ARMSTRONG SIDDELEY P.173.
OR ORENDA ENGINES P.S.13.
WITH ROCKET BOOSTER UNITS.
HAWKER AIRCRAFT LIMITED
E. 21730.

Hawker's drawing of the P.1103 with Red Hebe missiles bears out a point made in the brochure – that they would cause a huge amount of drag and badly affect the performance of the aircraft. *BAE Systems*

country, technical ability is too thinly spread to afford the duplication of effort which will occur if the aircraft firm is to be able to influence the design of, say, the guided weapons or AI equipment to more than a superficial extent.

"Also, by the time the aircraft designer is called in, preliminary studies of the overall system must have been carried out in order to arrive at the specification requirements. Hence the aircraft designer is presented with a partially determined solution. We are of the opinion therefore that the aircraft designer's contribution, during this next era, is limited to close collaboration with the designers of the various items of military load.

"Whilst the overall requirements determine the approximate characteristics of each component, these components are still being developed by different organisations in various forms, and for that reason a certain amount of latitude is available to the designer of the aircraft and its equipment. Within this limited freedom the smallest possible aircraft is presented in this brochure and, where alternatives exist, the smallest or lightest equipment is specified."

With Red Hebe

Following the submission of the Hawker brochure, at an unspecified later date, a new appendix was produced and circulated so that it could be attached to the back of existing copies. This was entitled 'Hawker P.1103 with 2 Red Hebes – descriptive notes' and came complete with its own mini table of contents. This was, belatedly, Hawker's note on tactics and strategy – the use of its aircraft in combat rather than a simple description of the aircraft itself.

The introduction started: "The performance penalty, in terms of the specification (F.155T) requirements, when two Red Hebe weapons are carried on the Hawker P.1103, is stated overleaf and on the attached tables and graphs.

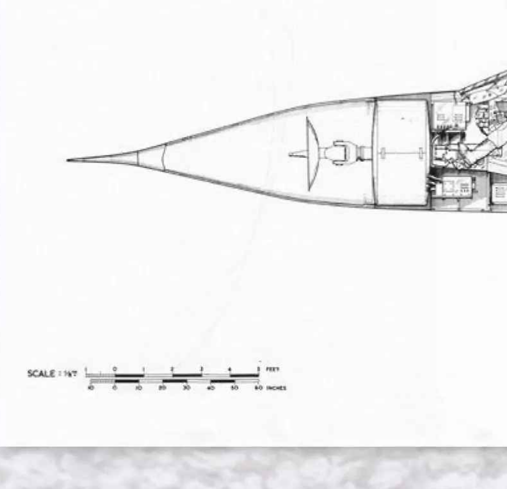
"In spite of this rather severe penalty, however, it is still possible by using the frontal attack technique for which Red Hebe is specifically designed, to intercept enemy bombers flying at Mach numbers up to 2.0 at 60,000ft over a wide front with the accepted Normal Warning Time."

The Vickers missile would be mounted "at the wing tips in a manner similar to the Vickers Small Weapons in our F.155T brochure, but considerably farther forward. This forward position has been chosen for the following reasons: to minimise aerodynamic interference, to ease the stability problem with and without the weapon, to provide adequate ground clearance in the tail-down and one wing low attitude.

"Special attention will be paid to the rigidity characteristics of the mounting arrangements and suitable production to that part of the wing affected by the rocket blast will be provided. It is not expected that the blast will have a detectable effect on the aileron control."

The grisly details of Red Hebe's impact on the P.1103's performance were then listed: maximum speed at 60,000ft cut by

Although the P.1103 was not a particularly small aircraft, its interior layout was impeccable as this brochure drawing makes plain. *BAE Systems*



Mach 0.25, ceiling lowered by 4,000ft, time to climb to 60,000ft and Mach 2 increased by 1.87 minutes, fuel use in doing so increased by 152 gallons. Turning radius at height and Mach 2 was increased by 1.9 miles and extra fuel used in this manoeuvre was 44 gallons.

Hawker argued that the much smaller and more aerodynamic infra-red homing Blue Vesta – the Blue Jay Mk.4 renamed – was suitable for tackling both Mach 1.3 and Mach 2 targets, offering belated descriptions of how an interception with this missile would be effected. First, against Mach 1.3 targets: “The fighter performs an energy climb reaching Mach 2.3 at 40,000ft. The remainder of the climb and the flight out to the target is continued at this Mach number (Mach 2.3 is chosen as the maximum sustained Mach number to which the light alloy structure may be subjected).

“The missile is limited in direction of attack, by consideration of minimum time of flight, to within 114˚ of astern target. A minimum radius turn is therefore commenced at the last moment to bring the fighter into a line of sight at the assumed missile lock on range of three nautical miles and at the limiting angle of 114˚ (the kinematics of the final stage of attack are thus in error since a missile collision course should be the aim. However, the effect on the kill line will be very small indeed).

“A front of 284 nautical miles is thus defended (limited by fuel exhaustion if the fighter is to return to its home base). Over the whole of this front the missile is operating at its minimum time of flight).”

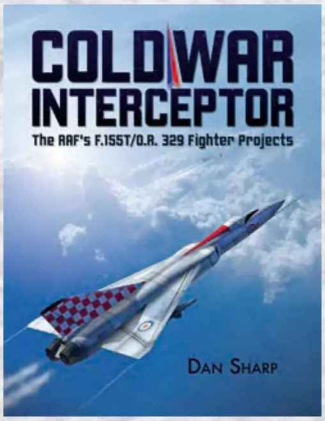
The Blue Vesta interception got a little trickier where Mach 2 targets were concerned however: “Here at small angles from ahead of base the fighter climb terminal Mach number must be reduced or the bomber will pass above the fighter before its climb is completed. Hence the fighter Mach number is held at 2.3 when the bomber approaches at more than 70 nautical miles to either side of base but is progressively reduced to give Mach 1.5 in the case of attack directly in line with base.

“The higher bomber speed further restricts the direction of attack to the rear hemisphere and a minimum radius turn is performed as previously described to bring the fighter in at 90˚ (in all cases where the bomber is reached ahead of base). A front of 315 nautical miles can be defended (limited by fuel exhaustion) but within 138 nautical miles of base the missile operates at its minimum time of flight; and within 70 nautical miles to either side of base, the turn is commenced immediately the top of the climb is reached.”

The add-on appendix concluded that Red Hebe was “slightly superior” when it came to dealing with enemies when they were almost on top of the interceptor’s base – within 180 nautical miles – but “high speed (Mach 2) targets attacking outside this lateral range and all subsonic and transonic targets are better countered with smaller and lighter weapons”.

Looking at Hawker’s brochure today, it is difficult to escape the conclusion that simple, poor presentation almost doomed the P.1103 from the outset. The aircraft itself was highly advanced and embodied some great ideas – such as the detachable boosters – not to mention outstanding performance, but the brochure failed to address any of the key issues that both the Air Staff and Ministry of Supply had agonised over. If Hawker had at least paid lip service to the weapons system concept, offered persuasive arguments in favour of pursuit course attack with Blue Jays and given a full (or indeed any) explanation of how automation and ground control guidance would be utilised, the firm’s chances of success might have been dramatically improved. ■

For more, see:
Cold War Interceptor
The RAF’s F.155T/O.R. 329
Fighter Projects
By: **Dan Sharp**
Published by **Mortons Media Group**
Hardback
Price on Amazon £27.50



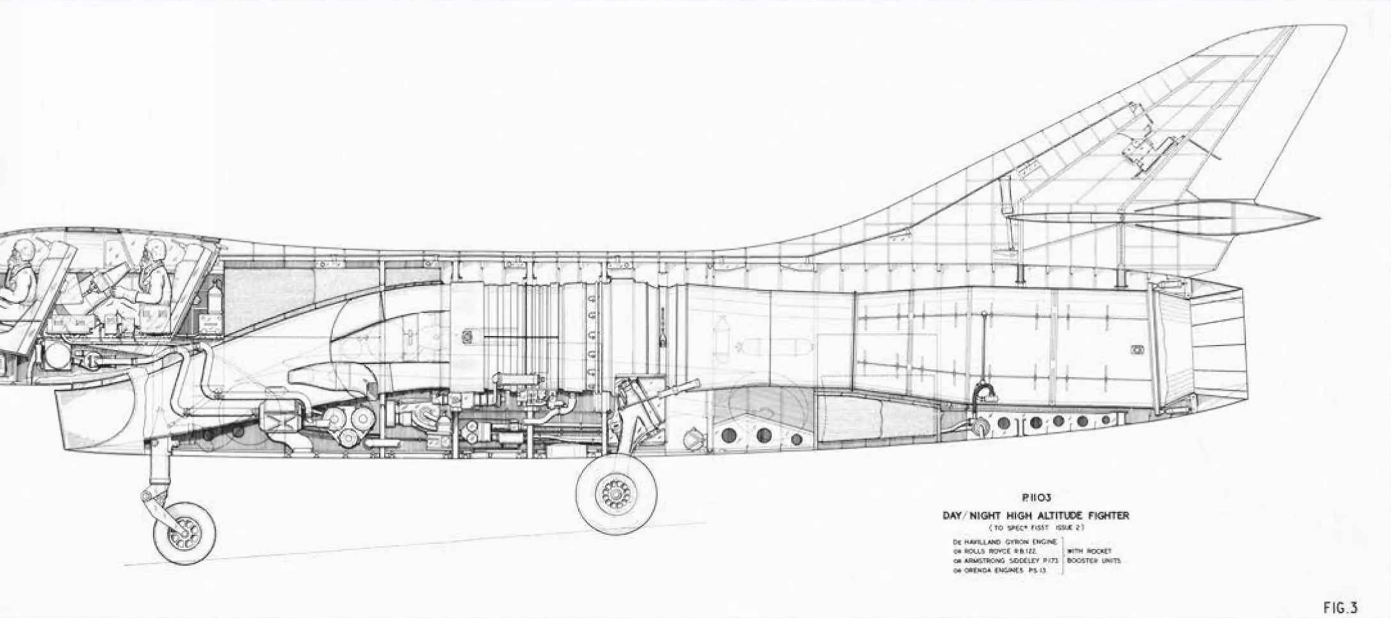

P.1103
DAY/NIGHT HIGH ALTITUDE FIGHTER
(TO SPEC° F.155T ISSUE 2)
DE HAVILLAND GYRON ENGINE
OR ROLLS ROYCE R.B.122
OR ARMSTRONG SIDDELEY P.173
OR ORENDA ENGINES PS.13
WITH ROCKET
BOOSTER UNITS

FIG.3

Naval air warfare comes of age

It was one of Japan's best-kept secrets during the war because, in reality, the Japanese had done almost nothing to reinforce Truk Lagoon. However, it served as a vital staging post for the Japanese Combined Fleet. The US Navy needed intelligence on the island and, once obtained, aimed to destroy the Japanese fleet and air power at Truk, allowing the US to bypass the island and advance to capture the Marianas. The US attack revolutionised naval air warfare in 1944, as Donald Nijboer reveals.

Grumman F6F-3 Hellcat fighters of VF-10 landing on *Enterprise* (CV-6) after strikes on the Japanese base at Truk. Folding wings and whirling propeller blades made the flight deck an extremely hazardous working environment. Constant vigilance was required to avoid injury or sudden death. *US Naval Historical Center*

On January 10, 1944, the brand-new aircraft carrier USS *Intrepid* (CV-11) arrived at Pearl Harbor. Rear Admiral Marc A. Mitscher boarded *Yorktown* three days later and took command of the newly formed Task Force 58 (TF-58). It was a formidable group comprising six fleet carriers: *Intrepid, Enterprise, Yorktown, Essex, Bunker Hill,* and *Saratoga,* along with five light carriers: *Belleau Wood, Cabot, Monterey, Princeton,* and *Cowpens*, carrying more than 500 Hellcats, Dauntlesses, Helldivers, and Avengers. The carriers were also equipped with night-bombing Avengers and F6F-3N and F4U-2 night fighters.

Supporting the carriers were an additional eight escort carriers, seven new battleships, six cruisers, and 36 destroyers, along with fleet tankers and related service vessels. Altogether, the combined fleet—light and escort carriers—could launch more than 750 combat aircraft. The new Pacific Fleet was now far stronger than it had ever been. So strong, in fact, that the earlier carrier strategy of hit-and-run raids used in 1943 no longer applied. Individual task groups could now position themselves off any enemy base and sustain air and naval superiority for as long as necessary.

In July 1942, the Japanese Combined Fleet headquarters was situated at Truk and acted as a major staging point for war supplies heading to the South Pacific. It was also a vital base for replacement aircraft assigned to Rabaul. For the Americans, Truk was regarded as the 'Gibraltar of the Pacific,' shrouded in mystery. Many believed the base to be impregnable, and during the first two years of the war, there was little or no intelligence available about it. On February 4, 1944, two Marine PB4Y-1 Liberators of VMD-254 flew a photo-reconnaissance mission 850 miles from Bougainville. Intelligence officers began mapping the base and the various anchorages in the lagoon. Planning for Operation Hailstone had begun.

Once the Marine aircraft departed, Admiral Mineichi Koga – commander of the Combined Fleet – knew the Americans would return. Koga ordered the fleet to withdraw to Palau, leaving behind two light cruisers, eight destroyers, several auxiliary vessels, and numerous transports. In terms of air defence, Truk had only 40 heavy and light AA guns to protect the base. However, there was no shortage of aircraft. A few days before the American attack, a large number of new A6M5 Model 52 Zeros were flown in, some heading as reinforcements for Rabaul. Additionally, roughly 64 Zeros from the 201st, 204th, 251st, 501st, and 902nd Kokutais were ready for combat. Some sources cite the number of Zeros available at 161. For offensive operations, the IJNAF had another 180 aircraft of various types, with around 100 operational 'Betty,' 'Kate,' and 'Jill' bombers.

In terms of both quantity and quality, the Navy Air Groups held a distinct advantage. Most VF Hellcat squadrons had combat experience, with many having aces among their ranks. The air battles of autumn 1943 demonstrated the Hellcat as the superior fighter. When paired with well-trained pilots and tactics designed to combat the Zero, the Hellcat proved to be a formidable opponent. While most agreed that the Zero was the superior fighter at slow speeds (200mph), able to turn inside the Hellcat, it lost that advantage at higher speeds. The Hellcat was faster in level flight and in a dive. It could also out-climb the Zero at low and medium altitudes. Additionally, it was considerably more rugged. Even when caught in the sights of a Zero, its chances of survival remained good. The Zero's armament of two 7.7mm machine guns and two

➤

Truk was not as heavily defended by AA guns as Rabaul was. The Japanese Army Type 98 20mm gun was among the weapons used to defend the base. With a rate of fire of 120 rounds per minute, the Type 98 proved to be a formidable weapon. *NARA*

IJNAF Units on Truk

4th Konkyochitai (Naval Base Force)
902nd Kokutai: 25 Aichi E13A Navy Type 0 ‘Jake’ Seaplane. Unknown number of Nakajima A6M2-N Navy Type 2 ‘Rufe’ Seaplane Fighters and Mitsubishi F1M Navy Type 0 ‘Pete’ seaplanes.

22nd Koku Sentai (Air Flotilla)
755th Kokutai: 8 Mitsubishi G4M Navy Type 1 ‘Betty’ bombers
552nd Kokutai: 15 Nakajima B5N2 Navy Type 97-3 ‘Kate’ torpedo bombers

26th Koku Sentai
204th Kokutai: 31 Mitsubishi A6M3 ‘Zero’ fighters
201st Kokutai: 8 Mitsubishi A6M3 ‘Zero’ fighters
501st Kokutai: 25 Mitsubishi A6M3 “Zero’ fighters
251st Kokutai: 9 Nakajima J1N1-S ‘Irving’ night-fighter
582nd Kokutai: 10 Nakajima B6N1 ‘Jill’ torpedo bomber
(Zeros consisted of a mix of A6M3-Model 22, Model 32, and an unknown number of A6M5-Model 52s flown in prior to the attack)

23rd Koku Sentai
753rd Kokutai: 10 Mitsubishi G4M Navy Type 1 ‘Betty’ bombers

28th Koku Sentai
551st Kokutai: 14 Nakajima B6N1 ‘Jill’ torpedo bombers

By January 1944, the strength of the US Navy’s Fast Carrier Task Force was truly formidable. For the attack on Truk, Task Force 58 assigned three of its Task Groups to the operation. Task Group 58.4, comprising the carriers *Saratoga, Princeton,* and *Langley,* was tasked with supporting Operation *Flintlock,* the landings on Eniwetok.

Task Group 58.1

Enterprise/Air Group Ten
VF-10: 32 F6F-3 Hellcats
VB-10: 30 SBD-5 Dauntlesses
VT-10: 18 TBF-1 Avengers
VF(N)-101: 4 F4U-2 Corsair Night-fighters
Yorktown/Air Group Five
VF-5: 36 F6F-3 Hellcats
VB-5: 36 SBD-5 Dauntlesses
VT-5: 18 TBF-1 Avengers
Belleau Wood/Air Group 24
VF-24: 26 F6F-3 Hellcats
VF-6: 12 F6F-3 Hellcats
VC-22B: 8 TBF-1 Avengers

Task Group 58.2

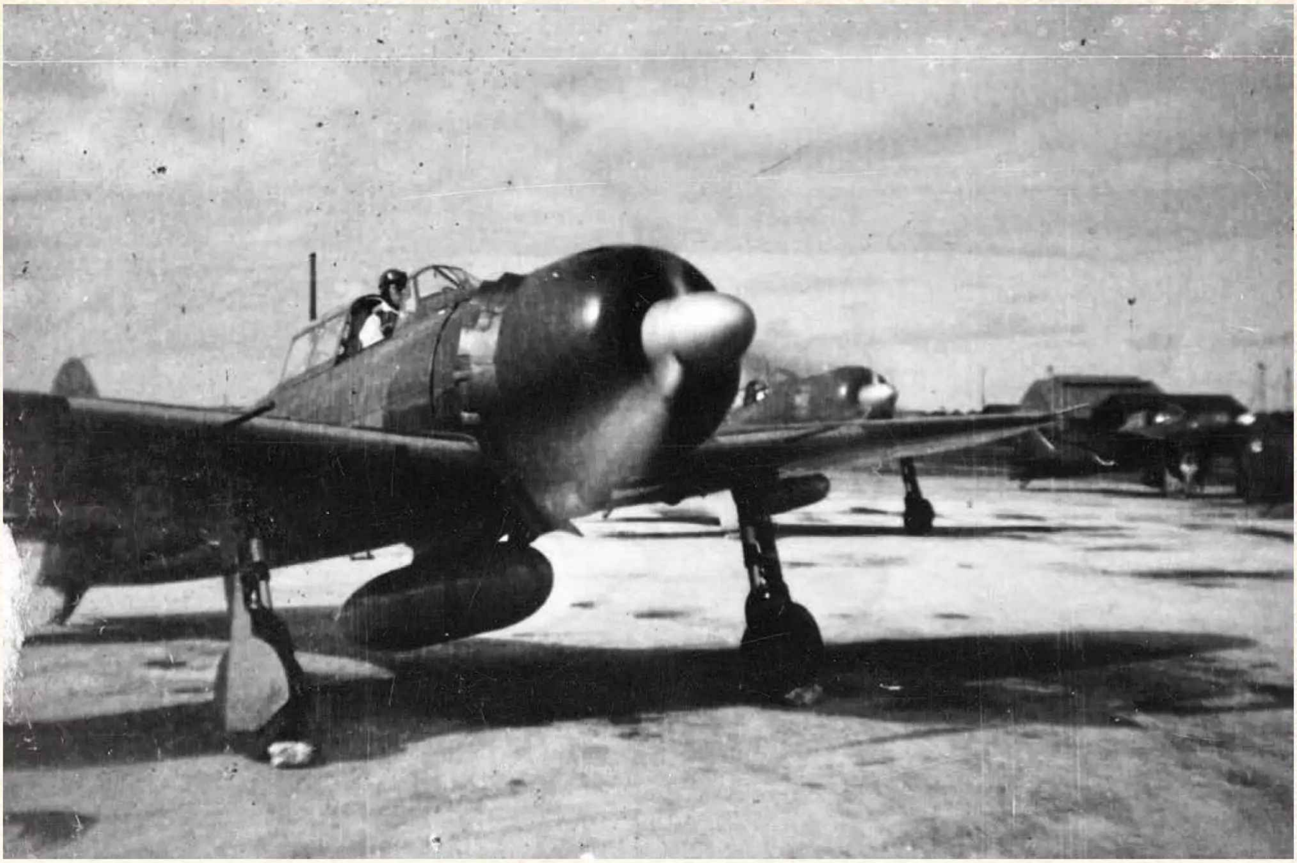
Essex/Air Group Nine
VF-9: 36 F6F-3 Hellcats
VB-9: 36 SBD-5 Dauntlesses
VT-9: 17 TBF-1, 2 TBM-1 Avengers
Intrepid/ Air Group Six
VF-6: 36 F6F-3 Hellcats
VB-6: 36 SBD-5 Dauntlesses
VT-6: 14 TBF-1, 5 TBM-1 Avengers
VF(N)101: 4 F4U-2 Corsair Night Fighters
Cabot/Air Group 31
VF-31: 26 F6F-3 Hellcats
VT-31: 8 TBM-1, 1 TGB-1 Avengers

Task Group 58.3

Bunker Hill/Air Group 17
VF-18: 37 F6F-3 Hellcats
VB-17: 31 SB2C-1 Helldivers
VT-17: 19 TBF-1, 1 TBM-1 Avengers
VF(N)-76: 4 F6F-3N Hellcat Night Fighters
Monterey/Air Group 30
VF-30: 25 F6F-3 Hellcats
VT-30: 5 TBF-1, 4 TBM-1 Avengers
Cowpens/Air Group 25
VF-25: 24 F6F-3 Hellcats
VT-25: 9 TBF-1 Avengers

slow-firing 20mm cannons meant that an accurate two- or three-second burst delivered too few rounds to be effective. The Aircraft Action Report for VF-16, dated December 4, 1943, highlighted the stark differences between the two fighters: “as far as armament, armour and general ruggedness of the airplanes were concerned, the F6F again shows itself immeasurably superior to the Zero”.

Japanese ace Saburo Sakai said after the war: “Our 20mm cannon were big, heavy, and slow firing. It was extremely hard to hit a moving target. Shooting down an enemy aircraft was like hitting a dragonfly with a rifle.”

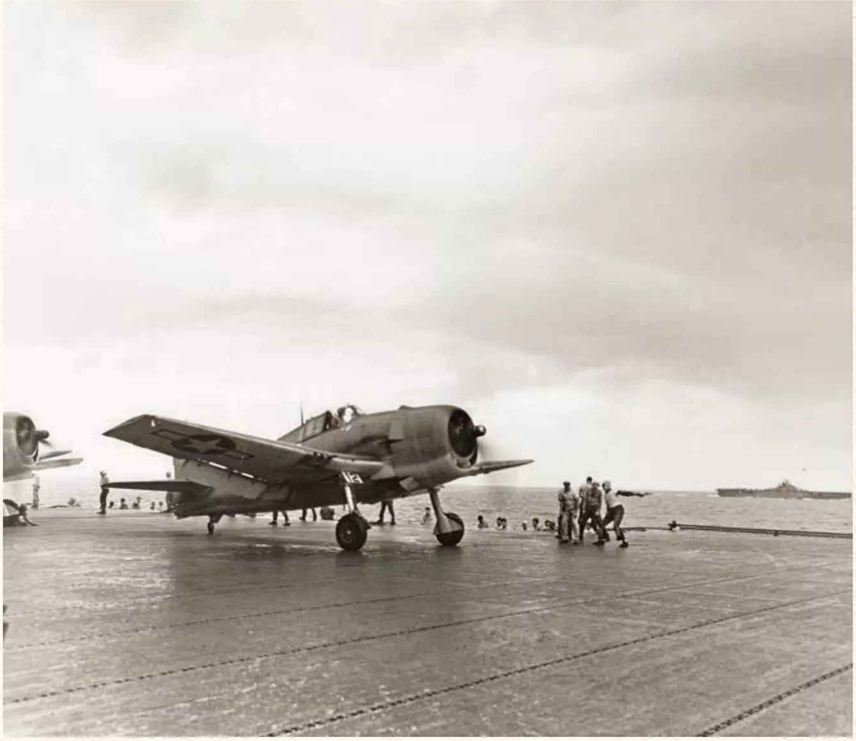


The model A6M5 Model 52 was designed to streamline production, accelerate manufacturing, and boost its diving speed. Heavy-gauge wing skinning was added, and the exhaust collector ring was replaced with straight individual stacks. Maximum speed reached 351mph at 19,000ft. *Author's collection*

For Zero pilots to have any hope of success, they needed the element of surprise, approaching unseen and firing at close range. However, by 1944, the quality of Japanese pilot training was poor, with the vast majority receiving little or no aerial gunnery training. An Aircraft Action Report from VF-9 dated February 26, 1944, confirmed, once again, the sorry state of Japanese fighter ability: "Zeke still very vulnerable to our fire from F6F-3 when hit in the area of wing roots or engine. Enemy VF pilots encountered in this action seemed to be outstandingly stupid and poorly trained in VF tactics."

Hellcat tactics were straightforward. Dive, fire, and then ascend back to altitude. For the Truk raid, Admiral Mitscher adopted a fighter technique used by the Luftwaffe during the Battle of Britain in 1940. Instead of flying close escort for the bombers, Bf 109 fighters flew ahead of the formations in sweeps or 'Freie Jagd' (free hunt), clearing a path for the bombers. The Truk strike would commence with a dawn fighter sweep of 70 Hellcats.

In terms of air defence and intercept tactics, the IJNAF failed to counter the ➤



With flaps down, a VF-9 F6F-3 Hellcat is given the signal for takeoff from Essex (CV-9) on the first day of operations against Truk, February 17, 1943. *US Naval Historical Center*

US Navy's methods. Instead of adopting the 'fighter four' and fighting pair approaches, Japanese squadrons continued to use the three-aircraft shotai as their standard tactical formation. This loose formation consisted of the shotai leader and two wingmen flying behind at different altitudes. When attacking, the shotai leader would signal for individual passes in line astern or line abreast.

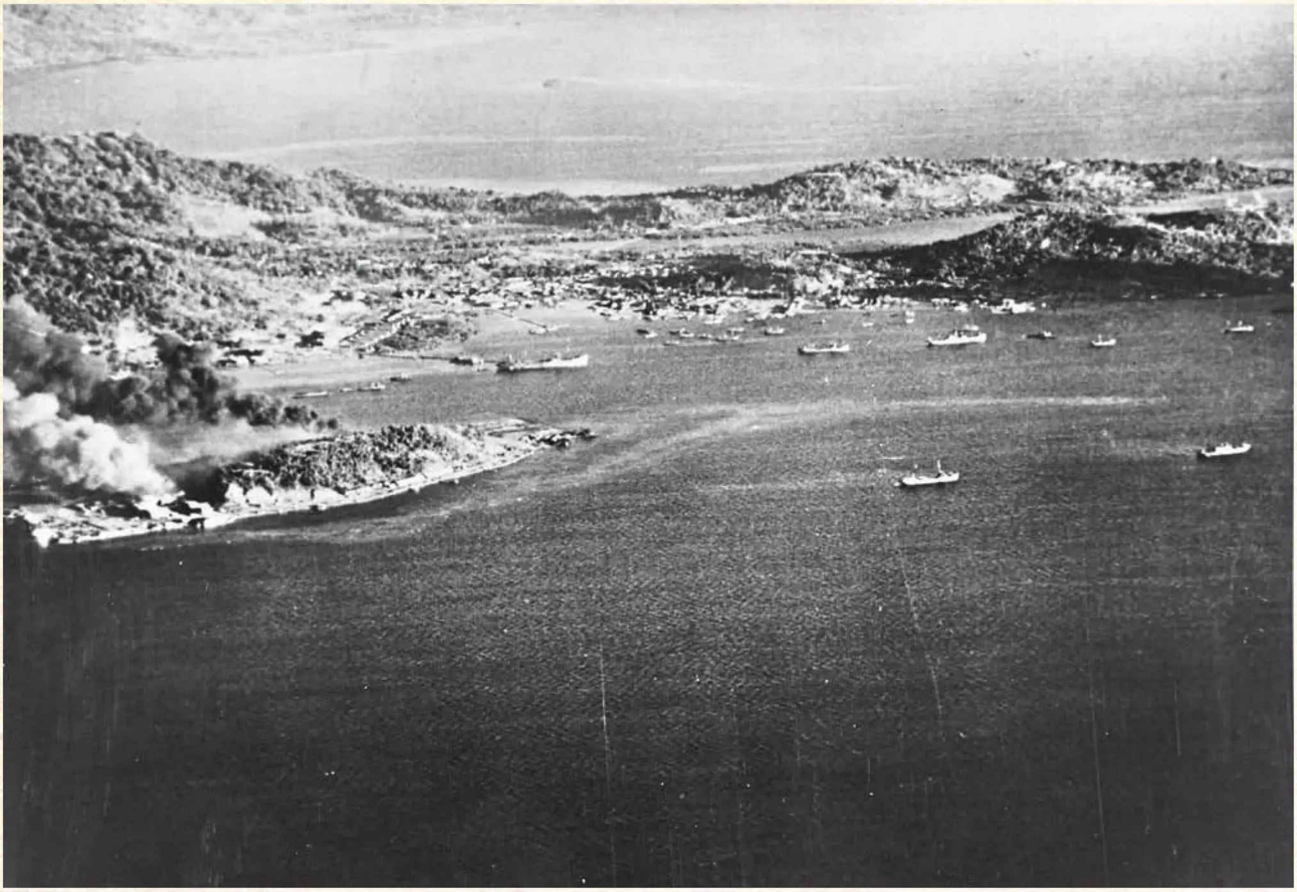
Compounding the Zero's inability to effectively intercept incoming raids was the complete lack of radio communications, both air-to-air and air-to-ground. Japanese radios were poorly designed and broke down very frequently. By 1944, Zero pilots simply removed them to save weight.

Just before dawn on February 16, 1944, Task Force 58 turned into the wind. Ninety miles east of Truk, the first Hellcats began their short take-off runs into the clear, cool morning air of the Pacific. Seventy-two Hellcats were launched, with each VF squadron assigned to a specific altitude. From top to bottom, 22 Hellcats from VF-18 provided top cover at 25,000ft, 12 Hellcats from VF-6 and 11 from VF-9 covered the medium altitudes, and low-level was assigned to the 12 Hellcats from VF-10 and 12 from VF-5.

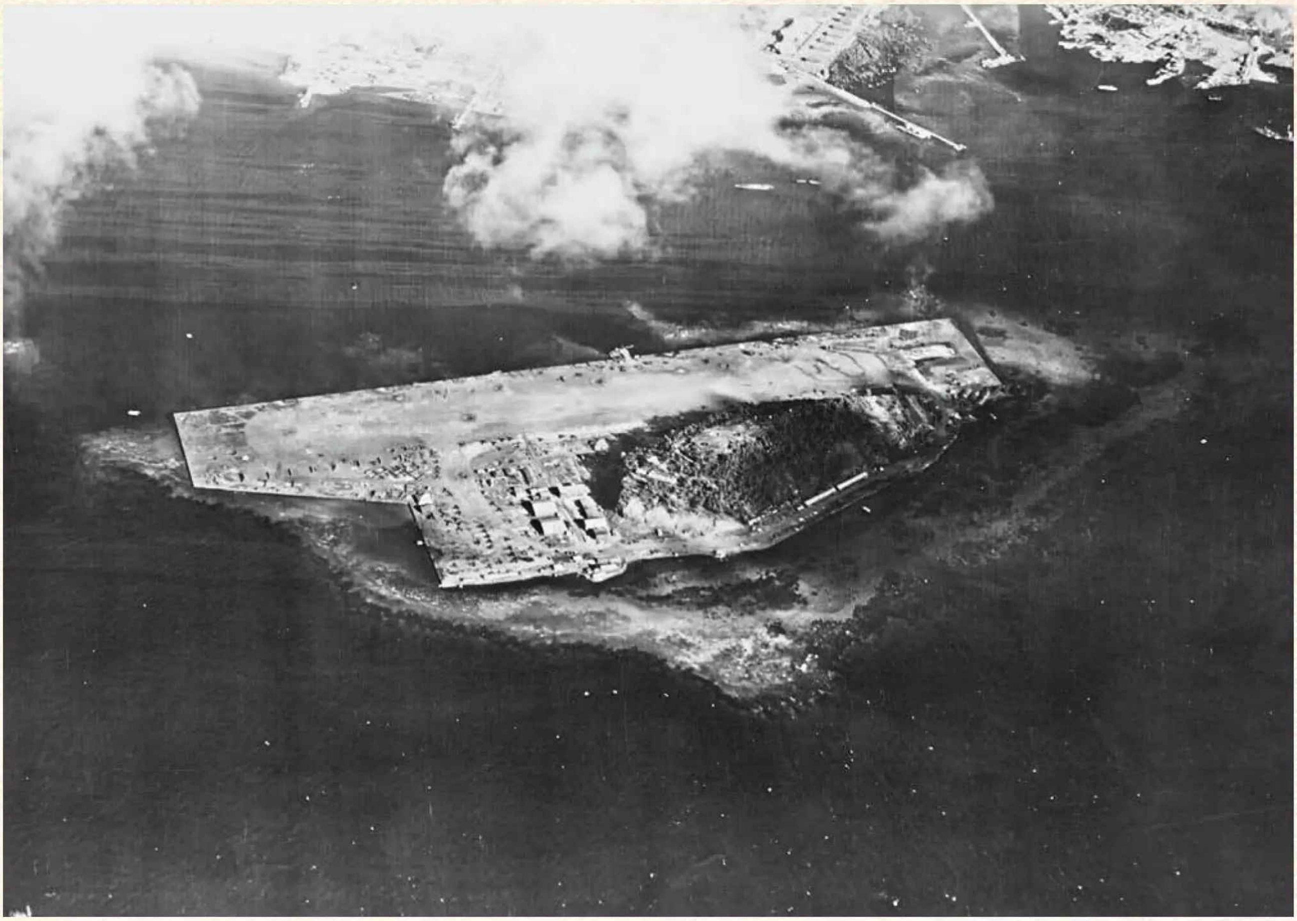
The Hellcats from the four light carriers, *Belleau Wood, Cowpens, Monterrey,* and *Cabot*, provided CAP for the fleet and served as a reserve. Japanese radar detected the incoming raid about 30 minutes away. Luckily for the Americans, the Japanese scramble order was delayed, and not all the defending fighters launched in time. As dawn brightened over Truk, the largest air battle of the Pacific War up to that point commenced. At 0800 hours, Lieutenant-Commander William Kane, commander of Air Group 10 and flight leader of the sweep, arrived over Moen Island. Reaching 8,000ft, Kane and the Hellcats of VF-10 spotted a large formation of Zeros climbing for altitude. As they attacked the Japanese formation of 40-50 Zeros, a fierce dogfight ensued. Within seconds, Zeros began falling from the sky in pairs and trios. Four Zeros attempted a poorly planned pass against Kane and his wingman, Lt Vernon Ude, each shooting one down. In less than five minutes, Kane and Ude had shot down five Zeros. Overall, the pilots of VF-10 claimed 14 aircraft shot down, with five more destroyed on the ground.

The Hellcats of VF-6 and VF-9 went in next. Fifteen minutes before reaching the lagoon, they began their climb from 1,000ft to 14,000ft. As the two squadrons headed towards Moen Island airfield, they could see the Hellcats of VF-5 and VF-10 below. Ten aircraft from VF-6 spiralled down to begin their strafing runs, and just as they did, Lt Alexander Vraciu and his wingman Ens Louis Little spotted several Zeros 2,500ft above them.

As the Japanese fighters came down, Vraciu and Little turned into the attack, forcing the formation leader to break off. Reacting quickly, Vraciu shot down two Zeros and a Rufe, with Little adding a Zero. Seconds later, Vraciu saw a Zero heading into a cloud: "I noticed one Zero skirting in and out of clouds, and as I made a pass at him, he promptly ducked back into them. I played cat and mouse with him for several



Eten Island was hit many times during the raid. Seen here on the first day of strikes, the damage is extensive. Dublon Island and the town are in the middle background, with several merchant ships offshore and one large tanker moored to the fuel pier on the left centre. *US Naval Historical Center*



Eten Island Airfield, Truk, photographed from a *Yorktown* (CV-10) plane February 17, 1944. A large number of Japanese aircraft are visible on the field, and numerous bomb craters are evident, but the field appears operational. Dublon Island is in the background, at top. *US Naval Historical Center*

minutes until I climbed into the sun to let him think I had retreated. When I came down on him for the last time, he never knew what hit him as his wing tanks and cockpit exploded. I ended up splashing four Zeros that day to bring my total aerial victories up to nine kills."

The strafing runs proved extremely destructive, with VF-6 claiming 24 aircraft destroyed on the ground and 11 in the air, at the loss of one pilot due to AA fire.

The most successful squadron of the day was VF-9. Assigned as top cover for the strafing Hellcats below, the three divisions (four aircraft per division) fought separate battles. As each division arrived over the target separately, the squadron's third division was the first to be attacked. As tracers flashed past their canopies, Lts Charles Moutenot, Bill Bonneau, and Eugene Valencia were forced to break hard. With Zeros all around, each was caught up in their own dogfight. Moutenot dispatched one Zero, Bonneau splashed one Zero, and three 'Rufes'.

Forced to dive from 14,000ft to low over the water, Valencia found himself boxed in by six to eight Zeros, firing at him continuously. Fortunately, their marksmanship was extremely poor. Taking the initiative, Valencia racked his big Hellcat around and made a head-on attack, shooting down one Zero. Hauling his fighter into a tight turn, he shot down two more. The other three dove away.

At the same time, VF-9's second division found itself tangled in a series of twisting dogfights lasting 30 minutes. Several formations of Zeros pounced on the division, forcing the formation into violent evasive manoeuvres.

For Lt Cdr Ed Owens of VF-5, the intense, confusing battle left a lasting impression: "We arrived over the target area with every advantage that could be desired: at dawn, in tactical formation and with the enemy caught by surprise with his aircraft on the ground.

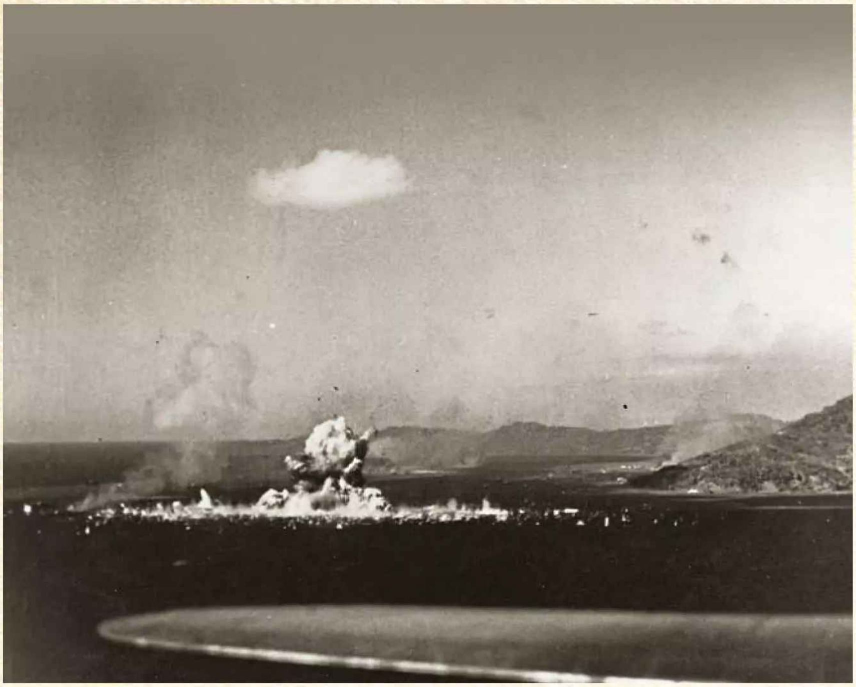
"As we started to strafe the airfield, quite a melee developed as the Japs began getting into the air. There were so many Japs aeroplanes moving that it was almost confusing to select a target and stay with it until it was shot down, without being lured to another target just taking-off.

"After a few minutes, it was difficult to find uncluttered airspace. Japanese aircraft were burning and falling from every quarter, and many were crashing on take-off as a result of strafing. Ground installations were exploding and burning, and all this in the early golden glow of dawn."

Multiple victories marked the day. VF-9 led with 36 confirmed air-to-air kills and an additional 25-27 destroyed on the ground. By 1400 hours, Hellcats had claimed a total of 204 destroyed in the air and on the ground, with 130 being air-to-air kills. Post-war Japanese records, however, confirmed only 70 shot down.

Bomb run

As the Hellcats engaged Japanese fighters from sea level up to 12,000ft the first strikes against shipping and airfields ➤



Japanese ammunition ship explodes after a dive-bombing attack by a US plane. The aircraft that dropped the bomb was caught in the blast and did not survive. Dublon Island is to the right, and Eten Island Airfield is in the middle distance. Facilities on both are on fire. *US Naval Historical Center*

commenced. Starting at 0443 hours, the carriers launched aircraft in 15-minute staggered intervals, resulting in a continuous stream of strike aircraft over Truk. The SBDs, TBFs, and SB2Cs from the three Task Groups were armed with a mix of 500lb, 1,000lb and 2,000lb general purpose bombs, M26 fragmentation cluster bombs, incendiary bombs, and Mk 13 torpedoes. The bombers from Air Group Ten from *Enterprise* and Air Group Five from *Yorktown* were the first to bomb. They were followed by Air Group Nine from *Essex* and Air Group Six from *Intrepid,* with Air Group 17 from Bunker Hill arriving last.

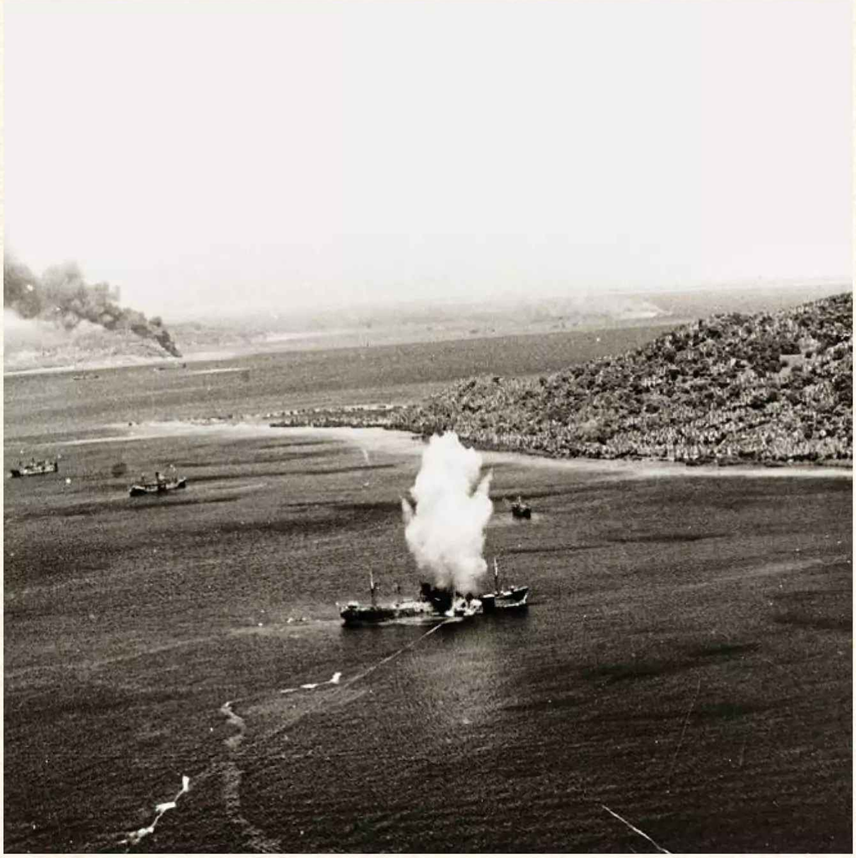
While most of the dive-bombers and the torpedo-armed Avengers focused on shipping, seven TBF Avengers from VT-10 attacked Eten airfield, dropping a mix of fragmentation and incendiary clusters. This was followed by strafing runs. Fifteen minutes later, the destruction continued with nine TBFs from VT-6 arriving. Their target was the Moen seaplane base, resulting in one 'Mavis' and 13 'Rufes' being destroyed.

In the harbour, strong winds hampered the bombers, but many hits were registered. None of the ships were sunk completely, but many were left smoking and ablaze. Japanese AA fire accounted for one SBD from VB-6 and one SB2C from VB-17.

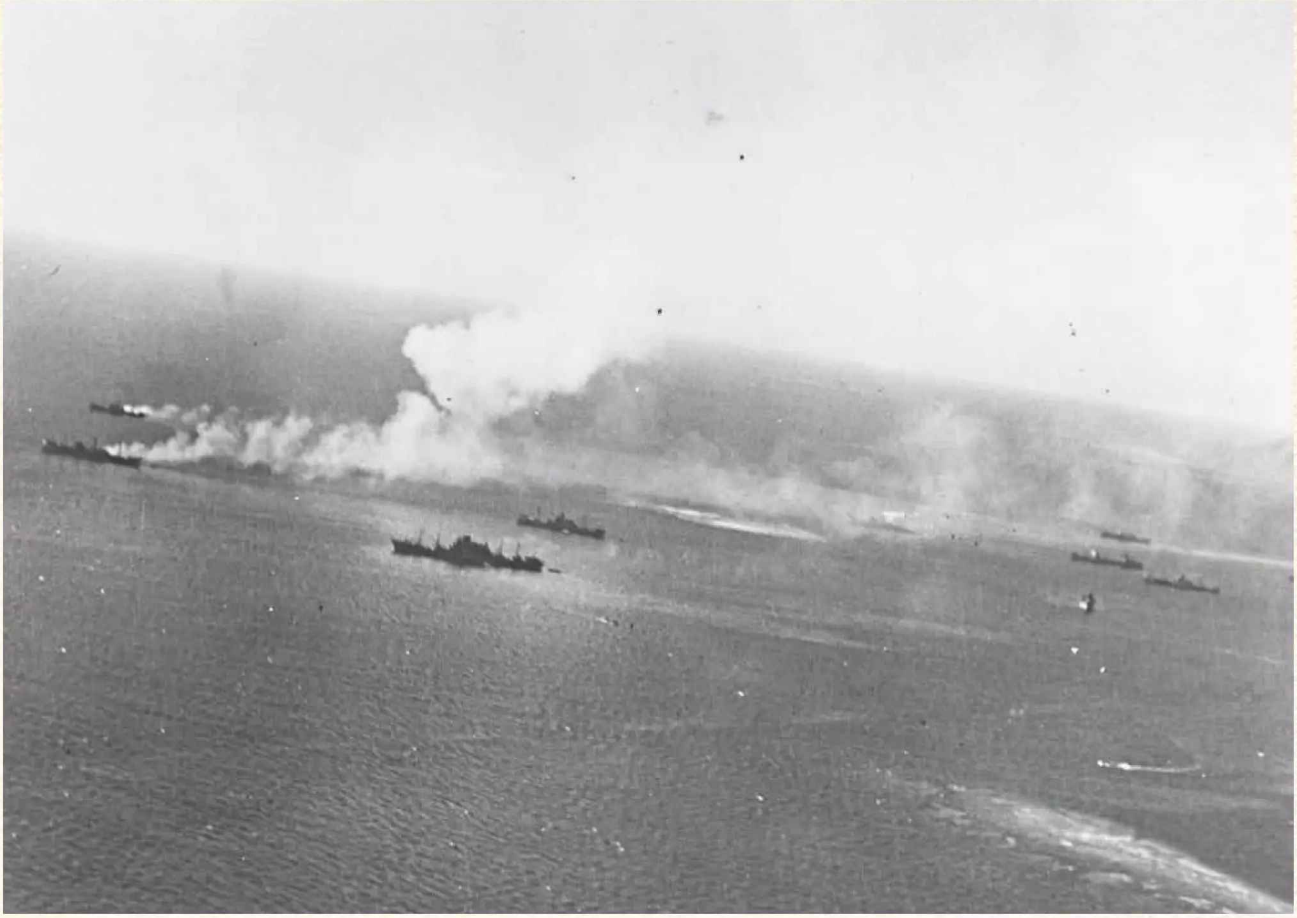
Even with the successful morning fighter sweep, several formations of Zeros attempted to intercept the bombers. The escorting Hellcats of VF-6 and VF-10 were quick to pounce. Lt Walter Harmon from V-10 was credited with three Zeros and a single 'Rufe'. Other VF-10 pilots claimed five more destroyed with VF-6 adding another three.

Japanese fighter resistance remained persistent and dangerous. From the damaged airfields more Zeros rose to the attack. As the second division SBDs from VB-10 went in they were met by four Zeros and a 'Rufe'. The rear gunners made their shots count, claiming one Zero and another damaged before making their escape.

Air Group Nine and Air Group Six from *Essex* and *Intrepid* added to the destruction. Air Group Nine consisted of nine TBFs from VT-9, 12 SBDs from VB-9 and an escort of 14 VF-9 Hellcats. Air Group Six added the same number from VF-6, VB-6 and VT-6. This strike package was led by Air Group Nine Commander Philip Torrey. Scouting ahead of the bombers, he spotted a number of ships near Dublon. VB-9, VT-9 and VT-6 were assigned to attack the



A Mark XIII aerial torpedo strikes a Japanese cargo ship during the first day of US Navy carrier air raids on Truk. Note the several torpedo wakes, including a very erratic one indicating the torpedo missed its target. *US Naval Historical Center*



Japanese ships under air attack off the east end of Dublon Island on the first day of the Truk raids. The large ship in the foreground is most likely the converted cruiser Aikoku Maru, which was lost in these attacks. *US Naval Historical Center*

shipping and VB-6 and three aircraft from VT-6 were sent to bomb the seaplane base at Moen and the airfield at Eten.

Selecting a destroyer and a large freighter near Dublon, the SBDs from VB-9 scored single hits on both. The TBFs of VT-9, armed with four 500lb bombs, had more success, claiming two ships sunk and two more severely damaged. As the ships burned, three VT-6 TBMs (General Motors-built Avengers) dropped one 2,000lb bomb each on Eten airfield while the others released their 500lb bombs on shipping.

The SBDs of VB-6 then headed for the seaplane base at Moen. Four aircraft were destroyed, and a large freighter was also hit.

The Japanese had little time to recover as Air Group 17 launched just 15 minutes after Air Group Seventeen and Air Group Nine. Seventeen Helldivers and nine TBMs, escorted by four Hellcats each from VF-18, VB-17, and VF-25, headed for Truk.

Late in the morning and into the early afternoon, the third and fourth strikes of the day were launched. As Japanese vessels attempted to leave Truk Lagoon through the North Pass, the SBDs of VB-6 and VB-9 and the TBFs of VT-9 stopped them. The light cruiser *Katori* and destroyer *Maikaze* endured repeated attacks. The Avengers of VT-9, armed with torpedoes, scored three hits amidships on the *Katori*, stopping it dead in the water. The SBDs of VB-9 focused on the *Maikaze* but achieved only several near misses. The fourth strike eventually caught up with the *Maikaze* when the SBDs of VB-6 hit its bow, bringing the vessel to a dead halt.

On the fifth strike of the day, the bombers were directed to attack the shipping in and around the anchorages near Dublon, Fenfan, Eten, Uman and Moen islands and the airfield on Parem. As the Hellcats from VF-10 strafed the airfield at Parem, the bombers scored numerous hits in the harbour, leaving a tanker and several freighters on fire. Following the Hellcats over Parem, the fragmentation bomb-equipped Avengers from VT-9 destroyed five aircraft on the ground.

In response to a small convoy heading for the open sea west of Truk, *Intrepid* launched 12 SBDs from VB-6 and 12 Hellcats from VF-6. The SBDs sank one tanker and damaged a freighter that sank later.

On the sixth and final strike of the day, the airfields were targeted with fragmentation and delayed-action bombs. Mitscher wanted to neutralise Truk's airfields to prevent any night raids on the fleet.

Air Group Ten bombed the airfield on Moen, dropping 128lb AN/M1A1 fragmentation bomb clusters. The SBDs of VB-10 then targeted revetments and hit nine Mitsubishi G4M 'Betty' bombers. Twelve Hellcats from VF-10 provided escort, with five dropping a single 1,000lb bomb each on the runway. Strafing attacks set 11 fighters alight.

Air Group Five was assigned to the airfield on Parem, bombarding it with fragmentation and delayed-action bombs. Air Group Nine followed with bombing and strafing attacks on the remaining damaged aircraft. Air Group 17 turned their attention to the airfield on Eten, with five Hellcats from VF-25 dropping single 1,000lb bombs. After their run, the SB2Cs from VB-17 ➤

A Zero caught in the gunsight of a US Navy Hellcat. Strikes are visible on the front cowling and mid-fuselage near the tail plane. The Hellcat squadrons claimed 62 A6Ms shot down on February 17. *NARA*

went into their dives. Running through a wall of heavy AA fire, they dropped their bombs on the service apron along the runway.

The first day's strike on Truk was a complete success. From early dawn and throughout the day, 30 separate air raids dropped 369 1,000lb and 498 500lb bombs, along with 70 torpedoes and numerous cluster bombs and incendiaries. The early fighter sweep proved highly effective. Initially, only 45 Zeros were scrambled, but they took too long to take off, giving the incoming Hellcat pilots the advantage. During the battle, another 45 Zeros joined the fight. More than 30 Japanese fighters were shot down, with 40 more destroyed on the ground by strafing. Most, if not all, of the Japanese fighters shot down would have lost their pilots, all for the loss of just four US fighters.

In the chaos of battle, the Japanese warships that attempted to escape were sunk by waiting US submarines or surface vessels, while others were struck and blocked in the lagoon by air attacks. The light cruiser *Naka* managed to escape but was intercepted 35 miles west of Truk. Several waves of SB2C-1s and TBF-1s from *Bunker Hill* and *Cowpen*s struck the cruiser with one bomb and one torpedo, splitting it in two and causing the loss of 240 crewmen (210 were rescued by other Japanese vessels).

On the night of February 17, the IJNAF retaliated. Any possibility of a daylight attack on the US carriers had been eliminated by the day's bombing and strafing assaults. At 1900 hours, six or seven B5N2 'Kate' torpedo bombers equipped with Type H-6 air-to-surface radar targeted TF-58. Night-fighters were dispatched to engage the intruders, but no contact was made. Most of the 'Kates' were driven off by intense AA fire, but at 2211 hours, a single intruder – either a 'Kate' or a G4M 'Betty' – locked onto the carrier *Intrepid* and struck it with a single Type 91 torpedo. With a jammed rudder and a large hole in its hull, the *Intrepid* was forced to withdraw, returning to the US for several months of repairs.

On the morning of 18, at around 0400 hours, the US Navy launched its first-ever low-altitude night bombing attack against enemy shipping from a carrier. Twelve radar-equipped TBF-1C Avengers from VT-10 took off from *Enterprise,* just 88 miles from Truk. Each Avenger was armed with four 500lb bombs as they approached Truk. The formation split, with five Avengers heading towards the anchorages around Moen and Eten Islands, and the remaining seven TBFs assigned to the large anchorage area west of Moen and Dublon Island. The Avengers attacked individually.

Coming in at 1,500ft and using their radar to identify targets, the pilots quickly found their reception hampered by many coral islets. The numerous ships at anchor also caused merged radar echoes. After searching for 30 minutes and selecting their targets, the Avengers began their runs.

Inaccurate Japanese AA fire ripped across the harbour, desperately searching for the approaching Avengers. The anchored ships held their fire and waited until the gunners could see the blue glow of the Avengers' exhaust flames. Several Avengers were hit as they passed over their targets. VT-10 scored 13 direct hits and seven near misses, resulting in eight ships destroyed and five damaged.

This success would lead directly to the formation of the first dedicated night air group, Air Group 41, operating from the light carrier *Independence* between July 1944 and February 1945. This was followed by Air Group 90, the second dedicated night-attack carrier air group to operate from *Enterprise* in 1945.

As dawn broke on February 18, the second day of strikes began. Turning into the wind, the carriers once again launched a fighter sweep of 72 Hellcats. But the mission was an anti-climax for the eager fighter pilots.

With no fighters remaining to engage, the Hellcats of VF-5 and VF-10 turned their guns on the airfields at Eten, Moen, and Parem, strafing any remaining aircraft and anything that moved. After attacking Moen, the fighters of VF-9 shifted their focus to shipping targets. This was followed by strike groups of 12 F6F Hellcats and 12 SBDs from each fleet carrier.

The air groups attacked the remaining ships in the harbour. The AA fire remained intense, and one Hellcat from VF-9 and one TBF from VT-5 were shot down.

Air sea rescue

For the pilots and aircrew of the Fast Carrier Strike Force, being shot down or ditching over the sea was a very real and frightening prospect. They also understood that by 1943, significant planning and resources had been allocated to the search-and-rescue of downed airmen. This included floatplanes like the Vought OS2U-3 Kingfisher, submarines, destroyers, and land-based PBY Catalinas.

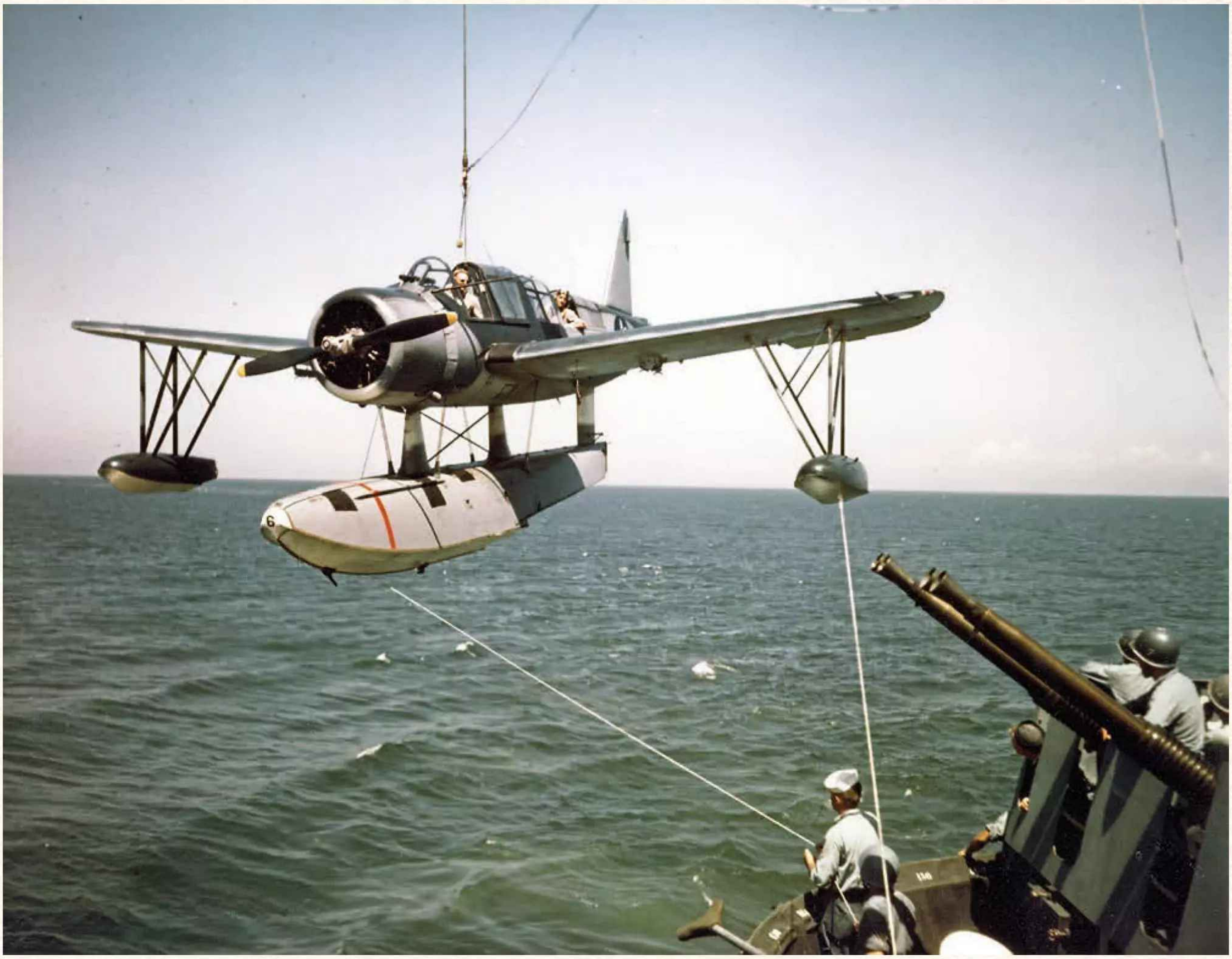
US Navy rescuers showed great courage and determination when rescuing their own. During the second day of strikes on Truk, the Hellcats of VF-9 strafed the airfield at Moen and ships in the harbour. On his final run over the harbour, Lt George Blair was hit by AA fire and forced to ditch his Hellcat in the lagoon. Capture was almost inevitable, but as he hit the water, the rescue call was issued. An OS2U-3 Kingfisher was launched from USS *Baltimore*.

While waiting for the Kingfisher to arrive, nine of Bell's squadron comrades stood guard, circling overhead. Each Hellcat remained as long as possible, only departing when their fuel was exhausted. When a Japanese destroyer spotted Blair's life raft, the Hellcats began strafing the vessel, forcing it to withdraw. The engagement lasted for 30 minutes, and when only two Hellcats remained, the Kingfisher arrived escorted by Hellcats from VF-9. Blair was swiftly hoisted aboard the Kingfisher and returned to *Baltimore*, exhausted but unhurt. During Operation Hailstone, 22 US airmen were rescued by aircraft, destroyer, and submarine.

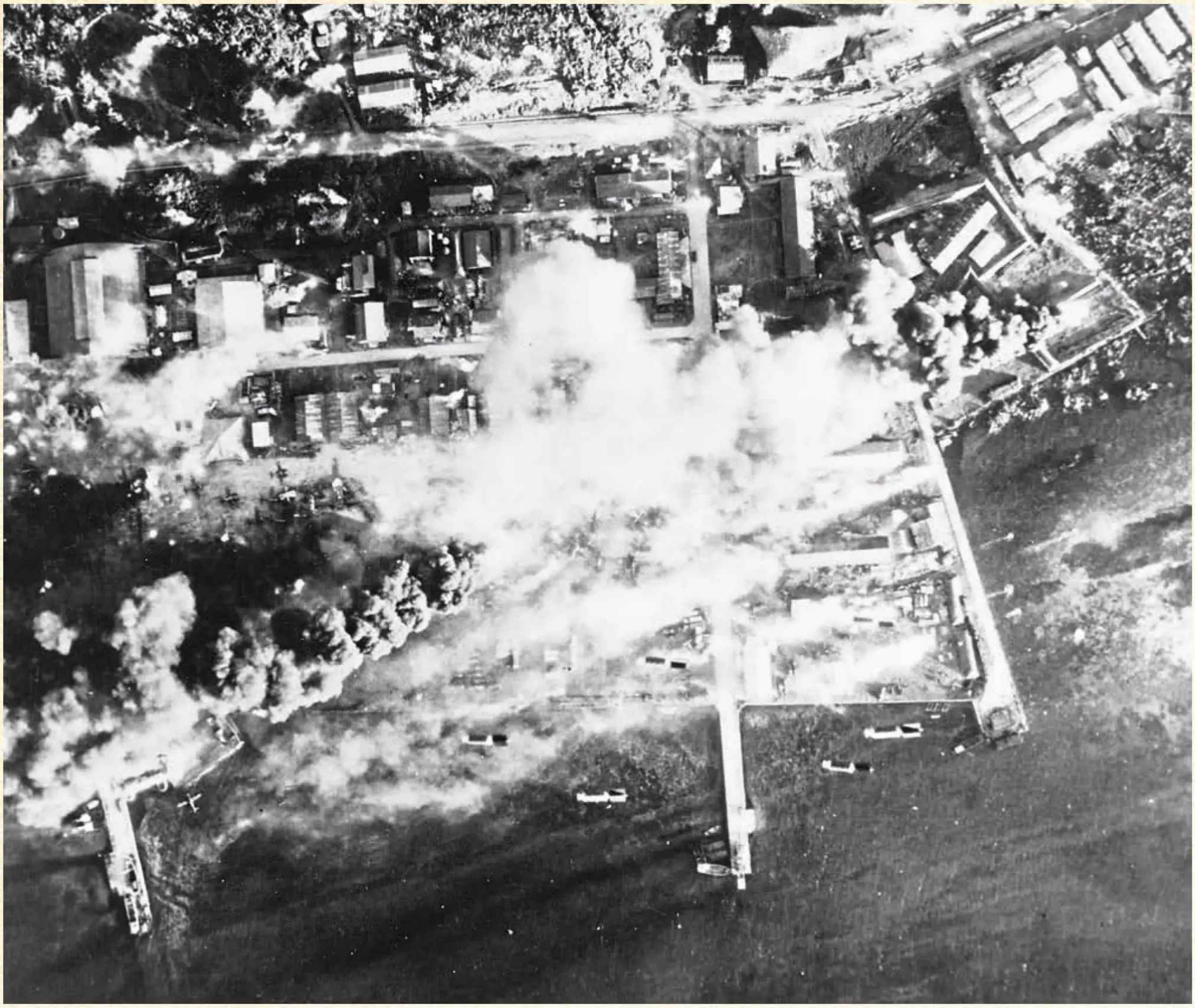
The third and final strike of the day targeted remaining airfield structures and the oil storage tanks on Dublon. The oil tanks had been saved for last to avoid pouring smoke over the harbour and obscuring the battle space around Truk. No air opposition was encountered as the SBDs and TBFs of VB-10 and VT-10 shattered the tanks, leaving a large black column of smoke to mark the end of a very successful operation.

As the aircraft departed, they left Truk a burning wreck. Nearly every structure on the island had been demolished, and approximately 17,000 tons of vital bunker oil for the Japanese fleet had been destroyed. Overall, the two-day strike on the 'Gibraltar of the Pacific' was an unmatched success. By the time the last aircraft landed on the carriers, TF-58 had flown 1,250 combat sorties, dropping 400 tons of bombs and torpedoes on shipping and 94 tons on airfields and land targets.

The IJNAF lost between 250 and 275 aircraft and 75% of its supplies. All the air units on Truk suffered heavy losses. The 204 Kokutai was the hardest hit, losing 18 of 31 pilots, while the 902 Kokutai was wiped out, losing all nine of its A6M2-N ➤



A Vought OS2U Kingfisher floatplane being hoisted aboard the battleship Missouri (BB-63). The Kingfisher was used extensively in the air-sea rescue role. Powered by a 450hp R-985-AN-2 radial engine and with the limited space on board, only one or two downed airmen could be rescued at a time. *US Naval Historical Center*



The Japanese seaplane base on Dublon Island under bombing attack on the first day of raids. In the lower centre of the photo are numerous fragmentation bombs heading for their target. *US Naval Historical Center*

'Rufe' fighters. Japanese warship losses were devastating. In both day and night attacks, US aircraft and surface vessels sank three light cruisers: *Agano, Katori,* and *Naka*; four destroyers: *Oite, Fumizuki, Maikaze,* and *Tachikaze*; three auxiliary cruisers: *Akagi Maru, Aikoku Maru,* and *Kiyosumi Maru*; two submarine tenders: *Heian Maru* and *Rio de Janeiro Maru*; submarine chasers *CH-24* and *Shonan Maru* 15; aircraft transport *Fujikawa Maru*; and 32 merchant ships. Damaged ships included two destroyers, two submarines, a repair ship, a seaplane tender, a submarine tender, and a freighter.

In stark contrast, Task Force 58 lost only 25 aircraft either shot down or damaged beyond repair, and 26 aircrew were killed. Of those aircraft shot down, 22 aircrew were rescued by floatplane, submarine, or destroyer.

Return of Task Force 58

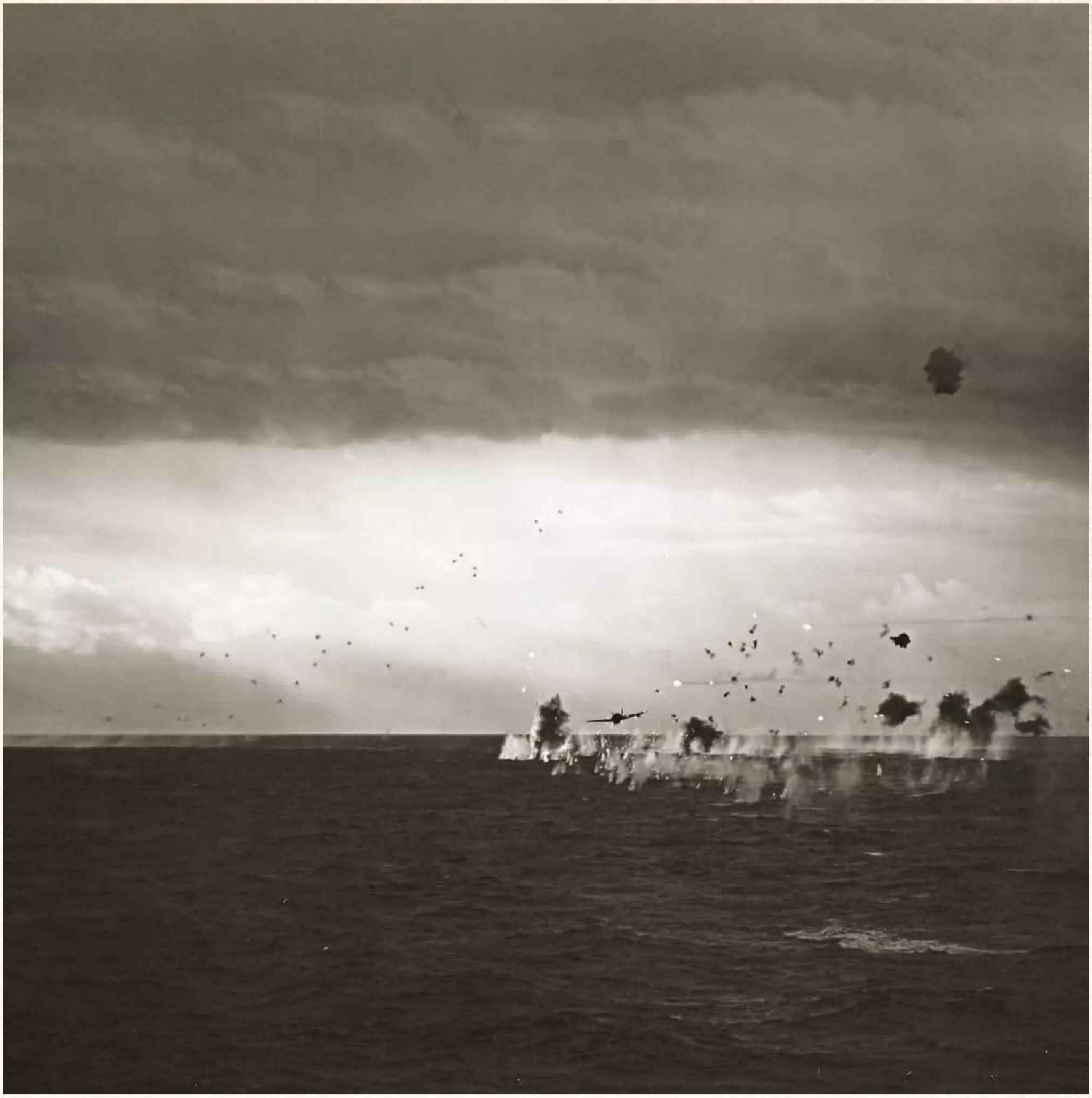
On 29, TF-58 returned to Truk for another two-day attack. Its main targets were Truk's remaining dockside facilities. Japanese radar detected the incoming raid, providing a 30-minute warning and enough time to launch a significant number of Zeros.

The dawn sweep of 84 Hellcats arrived at 0450 hours and was met by 37 Zeros. Like the first raid, the Hellcat pilots attacked the Japanese formations with good results. First were the Hellcats of VF-23, led by Lt Cdr Eddie Outlaw. During the morning sweep, he personally shot down five Zeros (reaching 'ace in a day' status), with the rest of the squadron adding 16 more. The pilots of VF-6 contributed 19 further kills, giving both squadrons a total of 35. Over the two-day strike, 2,200 sorties were flown, including 467 F6F fighter-bomber attacks. Bombs dropped totalled 748 tons. Task Force 58 claimed 58 air-to-air kills (including five 'Kates' on patrol) and 34 destroyed on the ground.

During the two-day strike, US losses totalled 22 aircraft: two shot down during the initial fighter sweep, while 20 were shot down by AA fire and 34 damaged.

The destruction of Truk was a disaster for the Japanese. Their plan for a strong perimeter defence, designed to delay the Americans while inflicting heavy losses, was shattered. Both air defence fighters and AA defences proved inadequate, and their offensive strike capabilities had to operate under the cover of darkness with limited success.

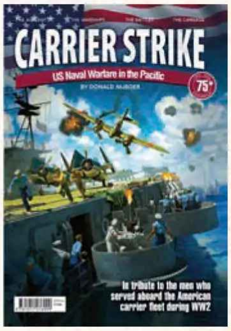
The myth of Truk's impregnability was shattered, and the subsequent US Navy strikes on the Marianas marked a revolution in carrier warfare. Operation



On April 23, Admiral Nimitz ordered a second strike on Truk for April 30. During the two-day raid, a small number of B6N2 'Jills' attacked TF-58.2. Here, a B6N2 runs through heavy AA fire as seen from Monterey (CVL-26). The 'Jills' failed in their attack, but US losses over Truk amounted to five aircraft in air combat and 21 to AA fire. This was the last time the once-vital Japanese base was targeted during the Second World War. *US Naval Historical Center*

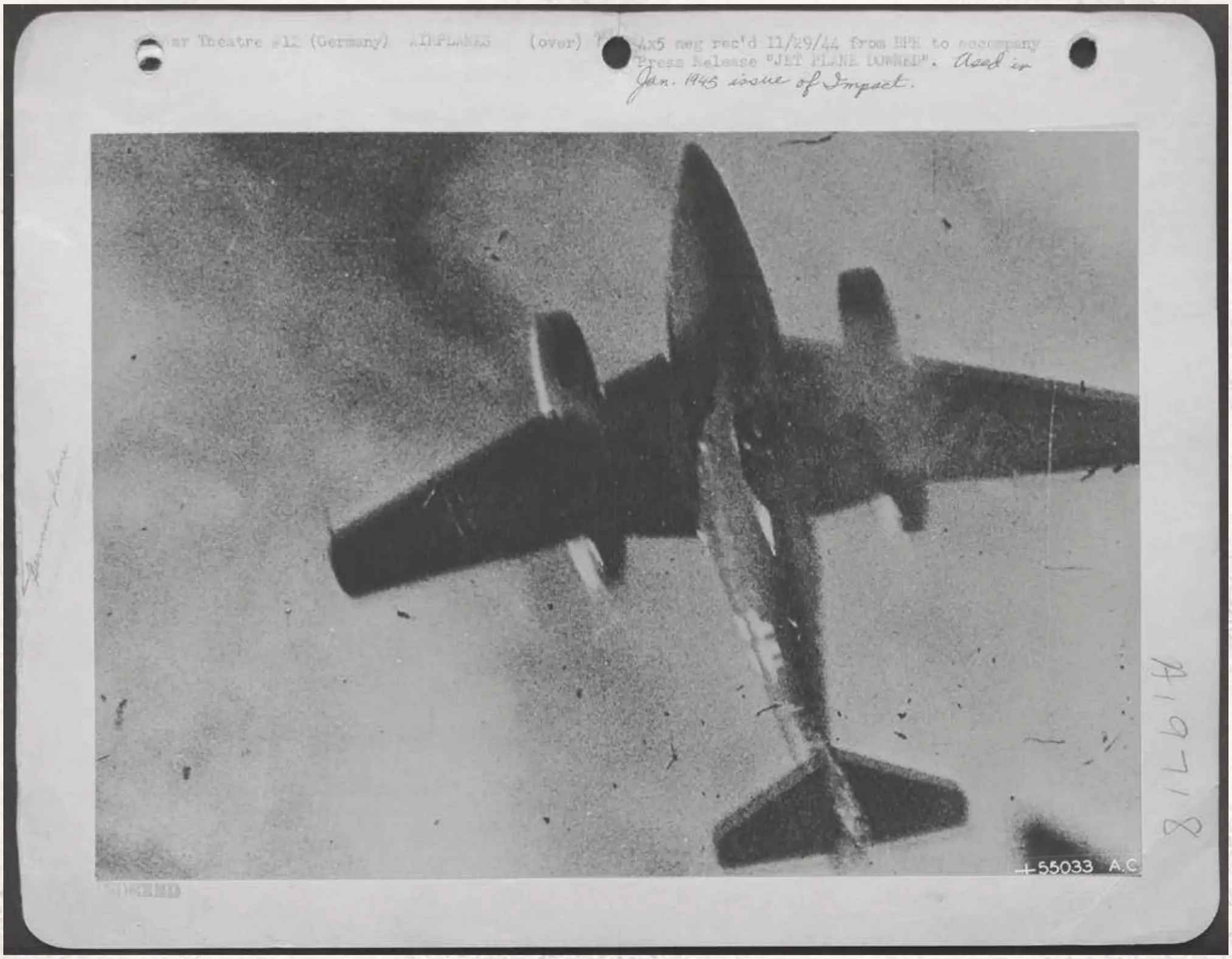
Hailstone demonstrated that the Navy's Fast Carrier Task Force could carry out multiple simultaneous operations. It had the mobility and striking power to achieve air superiority over the target, provide escort for dive and torpedo bombers, protect the fleet from air attacks, conduct night attacks and night fighter defence, conduct ASW patrols, and offer both air-sea rescue and naval gunfire spotting. Not only could the fast carriers support American amphibious operations from a short distance, but they could now strike deep into Japanese territory in a strategic rather than a purely tactical manner. ■

For more, see:
Carrier Strike –
US Naval Warfare in the Pacific
By: **Donald Nijboer**
Published by: **Mortons Media Group**
Price on classicmagazines.co.uk: £7.99


CARRIER STRIKE
US Naval Warfare in the Pacific
75th
In tribute to the men who served aboard the American carrier fleet during WW2

Flat spin

Arguably one of the most famous images of the Second World War's closing stages is a grainy close-up air-to-air view of a stricken Messerschmitt Me 262. This same image has been printed and reprinted across dozens – possibly – hundreds of publications since it was taken in 1944. But what is the story behind the picture?


ar Theatre #12 (Germany) AIRPLANES (over)
4x5 neg rec'd 11/29/44 from BPR to accompany Press Release "JET PLANE DOWNED". Used in Jan. 1945 issue of Impact.
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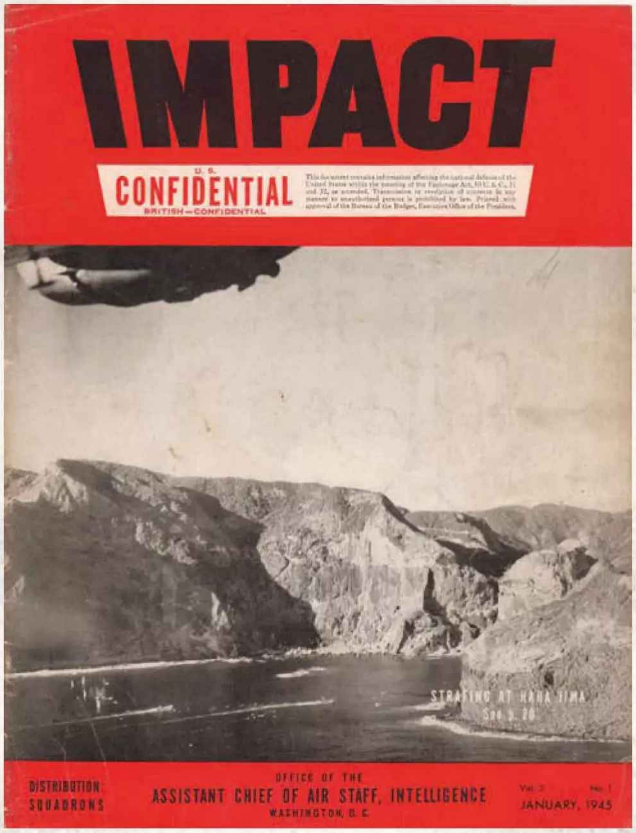
The iconic gun camera still, showing pilotless Messerschmitt Me 262 W.Nr. 110386, its starboard engine smoking, as it plummets towards the ground in a flat spin – chased by USAAF fighters.

Reviewing gun camera footage taken on November 1, 1944, a USAAF intelligence officer noticed a particularly graphic and unusual sequence. On November 29, 1944, a single frame from this sequence was chosen to accompany an official USAAF press release under the heading 'Jet plane downed'. The picture is a remarkable overhead view of a Messerschmitt Me 262 A-1a jet fighter, its cockpit canopy missing and smoke rising from its starboard engine. The aircraft's broad, cigar-shaped fuselage, swept wings and propellerless engine nacelles are starkly apparent.

The first publication to print this still appears to have been the January 1945 issue of *Impact*, the Army Air Force's confidential in-house magazine. It ran the picture side-on with the caption "Me-262, Germany's most successful jet plane, is nailed by 8th AF P-51" but gave no further details, since the press release presumably failed to include any. Since then the image, coded 55033, has appeared in innumerable magazines, books and other publications – and rarely with any additional context.



IMPACT

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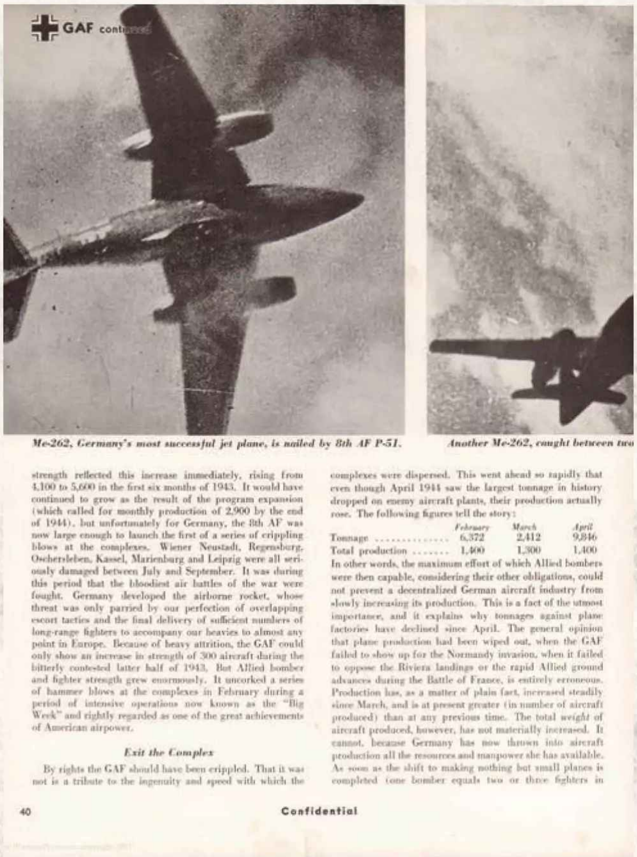
WASHINGTON, D. C.

Vol. 3 No. 1
JANUARY, 1945

The cover of *Impact* magazine's January 1945 issue – the first publication known to have printed the gun camera still showing W.Nr. 110386.



GAF continued

Me-262, Germany's most successful jet plane, is nailed by 8th AF P-51.

Another Me-262, caught between tw

strength reflected this increase immediately, rising from 4,100 to 5,600 in the first six months of 1943. It would have continued to grow as the result of the program expansion (which called for monthly production of 2,900 by the end of 1944), but unfortunately for Germany, the 8th AF was now large enough to launch the first of a series of crippling blows at the complexes. Wiener Neustadt, Regensburg, Oschersleben, Kassel, Marienburg and Leipzig were all seriously damaged between July and September. It was during this period that the bloodiest air battles of the war were fought. Germany developed the airborne rocket, whose threat was only parried by our perfection of overlapping escort tactics and the final delivery of sufficient numbers of long-range fighters to accompany our heavies to almost any point in Europe. Because of heavy attrition, the GAF could only show an increase in strength of 300 aircraft during the bitterly contested latter half of 1943. But Allied bomber and fighter strength grew enormously. It uncorked a series of hammer blows at the complexes in February during a period of intensive operations now known as the "Big Week" and rightly regarded as one of the great achievements of American airpower.

Exit the Complex

By rights the GAF should have been crippled. That it was not is a tribute to the ingenuity and speed with which the complexes were dispersed. This went ahead so rapidly that even though April 1944 saw the largest tonnage in history dropped on enemy aircraft plants, their production actually rose. The following figures tell the story:

	February	*March*	*April*
Tonnage	6,372	2,412	9,846
Total production	1,400	1,300	1,400

In other words, the maximum effort of which Allied bombers were then capable, considering their other obligations, could not prevent a decentralized German aircraft industry from slowly increasing its production. This is a fact of the utmost importance, and it explains why tonnages against plane factories have declined since April. The general opinion that plane production had been wiped out, when the GAF failed to show up for the Normandy invasion, when it failed to oppose the Riviera landings or the rapid Allied ground advances during the Battle of France, is entirely erroneous. Production has, as a matter of plain fact, increased steadily since March, and is at present greater (in number of aircraft produced) than at any previous time. The total weight of aircraft produced, however, has not materially increased. It cannot, because Germany has now thrown into aircraft production all the resources and manpower she has available. As soon as the shift to making nothing but small planes is completed (one bomber equals two or three fighters in

40

Confidential

'Me-262, Germany's most successful jet plane, is nailed by 8th AF P-51' – from the pages of *Impact*.

Today, however, it is possible to add a little more to the background and circumstances of this enigmatic and iconic image. The story begins on November 1, 1944, with a bombing raid mounted by Boeing B-17 Flying Fortresses of the Eighth Air Force's 379th Bomb Group against two factories producing synthetic oil at Gelsenkirchen in Westphalia, Germany, and the Hindenburg bridge over the river Rhine at Rüdesheim. The bombers set off before midday and were escorted by fighters of the 352nd FG, known as the 'Bluenosers', the 20th FG and the 56th FG.

The strike force reached its targets unopposed but on the way home – the 379th's base was USAAF Station 117, aka RAF Kimbolton in Cambridgeshire, while the 352nd were stationed at RAF Bodney in Norfolk – they were set upon by German fighters.

But these weren't run-of-the-mill Bf 109s or Fw 190s; the formation had been sighted by the Me 262s of Kommando Nowotny's 3. Staffel. Kommando Nowotny, stationed at Achmer airfield near Osnabrück in Lower Saxony, northwest Germany, and led by ace pilot Walter Nowotny had been established on September 26, 1944, specifically to trial and develop tactics for the Me 262.

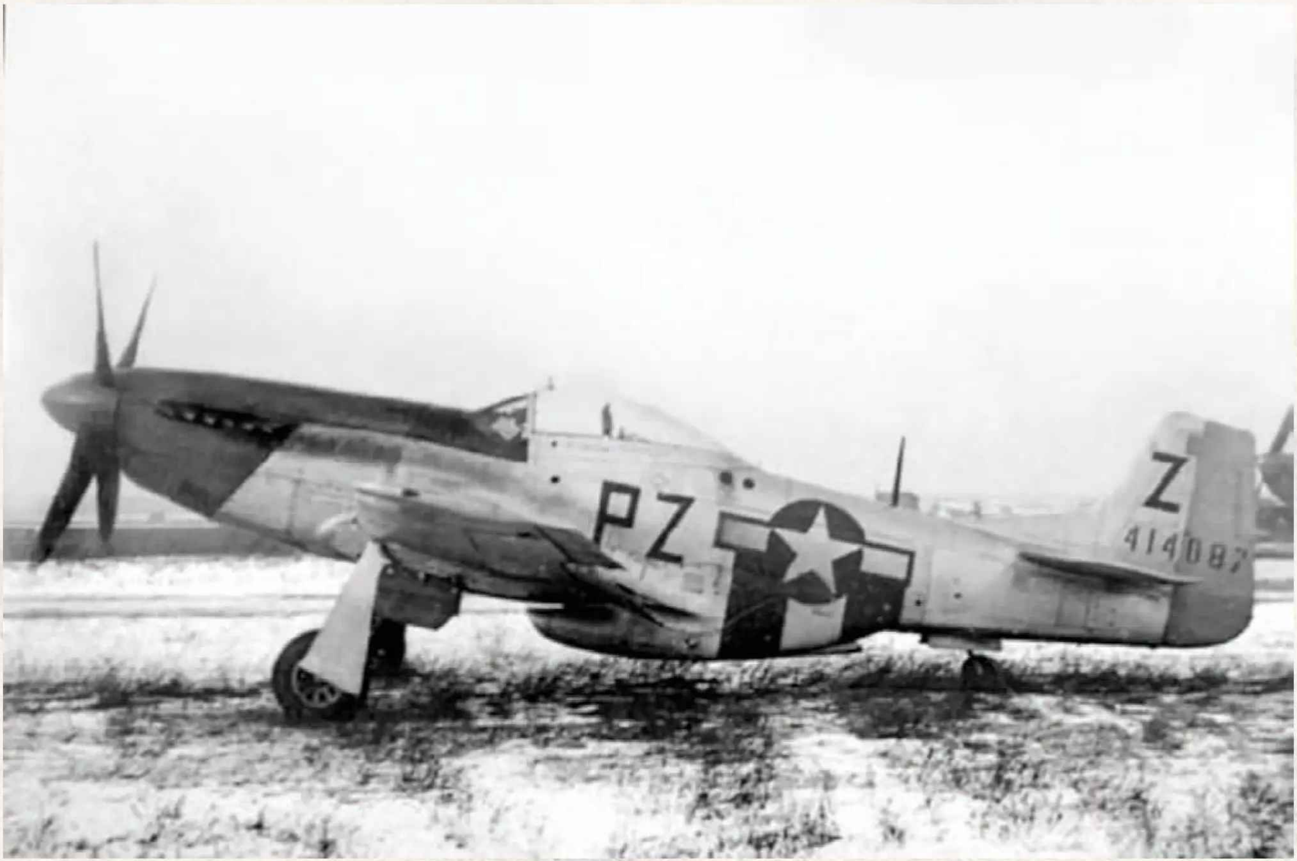
The unfortunate Second Lieutenant Denis J. Alison of the 77th FS/20th FG. Shot down by Oberfähnrich Willi Banzhaff, he was initially listed as MIA but eventually acknowledged as killed in action even though his body was reportedly never found.

It was 2.12pm when one of the 3./Kdo. Nowotny pilots, Oberfähnrich Willi Banzhaff, dived down to 30,000ft and attacked the leading group of North American P-51D Mustang escorts from behind. He reportedly hit the Mustang of 2nd Lt Denis J. Alison of Yellow Flight from the 77th FS/20th FG, which caught fire and went into a dive.

Passing the survivors of Yellow Flight, Banzhaff kept going – heading for the nearest formation of B-17s. Watching this engagement unfold had been 56th FG pilots flying Republic P-47 Thunderbolts as well as 352nd pilots flying P-51Ds. It appeared that Banzhaff was on his own and the Americans immediately saw an opportunity to take down one of Germany's much-vaunted new jets.

Banzhaff soon became aware that he was facing impossible odds and decided to make a sharp exit. He recovered from his dive at 9000ft and then executed a 180-degree turn at full power before making for a bank of cloud.

By now, the aircraft were flying over the Netherlands. Noting Banzhaff's direction of travel, and realising that his view would be blocked by the clouds, many of the American fighters moved to cut him



Lieutenant William T. Gerbe's P-51D Mustang PZ-Z 'Little Gyp'.

Lieutenant, later Captain, Walter 'Wally' Groce – who shared credit for the victory against Banzhaff with Gerbe.

off – positioning themselves where they expected him to exit the cloud.

Among them was Lieutenant William T. Gerbe of the 486th Fighter Squadron, 352nd FG, piloting P-51D serial 44-14087, coded PZ-Z 'Little Gyp'. Rather than attempting to leave, Gerbe thought Banzhaff was trying to lure the escorts away from the bombers.

In his post-mission report, he stated: "We first saw this Me 262 at our altitude, which was 31,000ft. He made a pass on the flight in front of us and started a diving run to the right. At about 12,000 or 13,000ft. Red Flight was closing in on him. I had more speed than my element leader so I called on the R/T and told him I was going after the Jerry. Just about that time the Me 262 made a turn into me.

"I turned with him and it put me to the right on his tail. I was using the K-14 gunsight, and first opened fire at 200 yds, saw hits on the tail section, closed to about 150 yds and shot out his right engine as he was climbing to leave behind me.

After I shot his right jet out, the Me 262 went into a flat spin to the right. The pilot bailed out a few seconds later. While the aeroplane was spinning down, about 16+

P-51s and P-47s were taking shots at it. The Me 262 did not catch fire. The pilot bailed out at about 9000ft. My flight leader, Capt. [Chester V. 'Chet'] Harker had been able to close to within firing range or the enemy aircraft when he made the 180-degree turn. He fired several bursts and I observed strikes in the tail section. When the enemy aircraft pulled up into a climb, Capt. Harker followed him, but I was in a better position to close to a shorter range. I claim one Me 262 destroyed, shared with Capt. Harker."

However, as Gerbe himself acknowledged, he and Harker were not the only ones firing at Banzhaff. After the mission, Lieutenant Walter 'Wally' Groce, a P-47 pilot with the 63rd FS/56th FG, also claimed to have shot out Banzhaff's starboard engine.

In the end, Harker's claim was disallowed and Gerbe's claim was shared with Groce. Gerbe, who had previously shot down two Bf 109s on September 12, 1944, ended the war with those 2.5 victories. Groce had 3.5. Banzhaff, meanwhile, had indeed got out and landed safely by parachute.

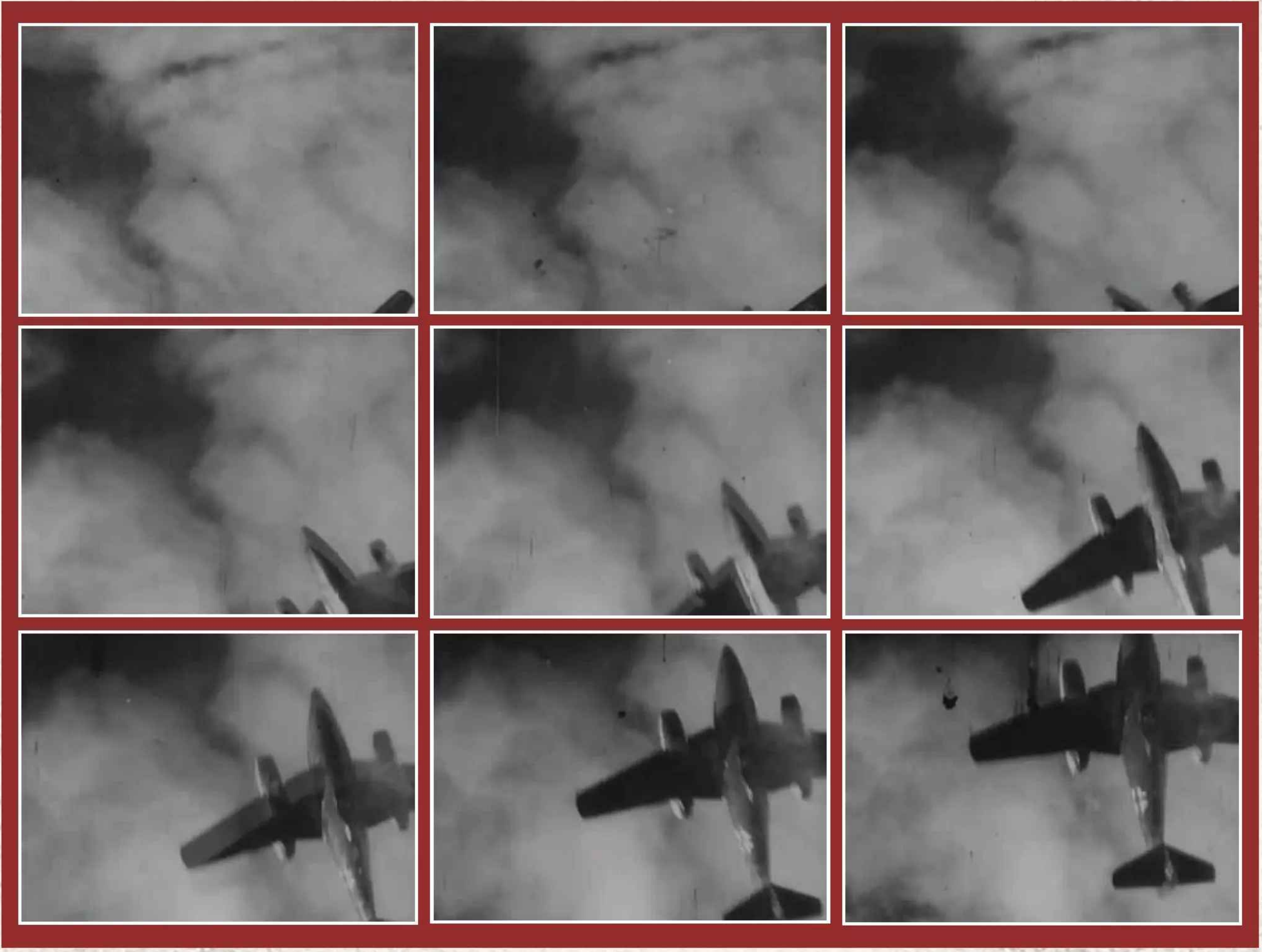
Spinning out

Exactly which of the American aircraft firing at Banzhaff's Me 262 A-1a W.Nr. 110386 captured the gun camera footage of it going down on November 1, 1944, is unclear. But it remains a striking sequence – the pilot and canopy are gone and with one engine out but the other still running, the aircraft is in a flat spin, clearly dropping like a stone but remaining level. At this point at least six P-51s and P-47s were chasing it down, still firing, each hoping to see it burst into flames and break apart.

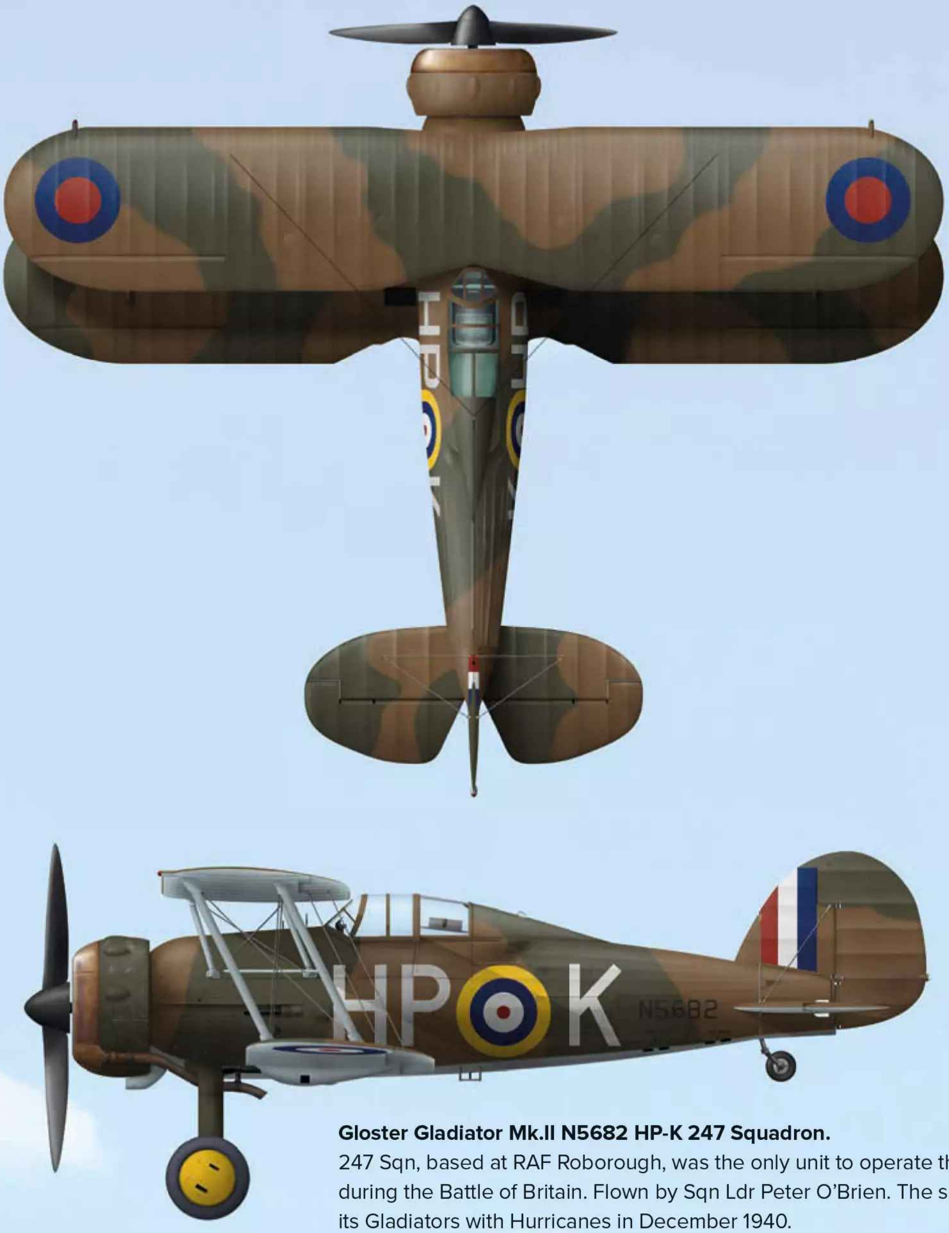
But in the end, as recorded by Gerbe, the Me 262 never did catch fire. The Americans pulled out of their dives and left 110386 to its fate. Evidently, it crashed somewhere between Enschede and Zwolle in the Netherlands.

As for Banzhaff himself, he must have managed to get a lift back to Achmer, which is about 40-45 miles (65-70km) from Enschede. The journey would have taken perhaps a couple of hours assuming motor transport could be found. Two days later, on November 3, 1944, he was back in the air in another Me 262 A-1a, this time W.Nr. 110483. Flying with a comrade south of Hamburg, he was spotted by Wing Commander John Basil Wray, the commanding officer of 122 Wing, who was piloting Hawker Tempest Mk V EJ750 on a routine patrol.

Wray was flying at 18,000ft – high above the Me 262s – and used this height advantage to the fullest by entering a power dive towards the jets. When they spotted the Tempest, the Germans attempted to turn away and use their own speed advantage to evade him but it was too late. Wray fired on Banzhaff's machine and a large chunk of it reportedly flew off before it flipped over onto its back and entered an inverted dive. Wray followed it down but lost track of it as it entered a cloud. He claimed it as damaged but according to German records Banzhaff failed to escape this time. He crashed near Hittfeld-Lüneburg and was killed. ■



The full sequence of stills showing Me 262 A-1a W.Nr. 110386 spinning clockwise as it falls.



Gloster Gladiator Mk.II N5682 HP-K 247 Squadron.
247 Sqn, based at RAF Roborough, was the only unit to operate the Gladiator during the Battle of Britain. Flown by Sqn Ldr Peter O'Brien. The squadron replaced its Gladiators with Hurricanes in December 1940.

WWII FIGHTERS IN PROFILE – GLOSTER GLADIATOR

When the Gladiator was first developed, it was at the leading edge of aviation, even though the potential of monoplanes was already becoming evident, and they would soon render the Gladiator obsolete. Despite the biplane's design flaws, the Gladiator continued to operate in the early stages of World War II, claiming notable kills. *All words and artworks by Chris Sandham Bailey*

The Gladiator entered service during a period of air pageants when tight, precise formation flying was a highly respected skill (on occasions, multiple aircraft were tied together for the duration of the display). Still, such was the need for aircraft when war came that it was forced to compete against advanced monoplanes until suitable replacements could be produced and delivered to units.

The biplane was deployed in the Middle East and Mediterranean during the first two years of the war, with the three Sea Gladiators of Malta becoming legends in their own right when defending the island.

During the interwar years the Gloster Aircraft Company had continued to supply the RAF with a range of biplanes such as the Gamecock, Goshawk and Gauntlet. The main advantage these had over earlier fighters was their metal structure, a concept that the company's chief designer Henry Folland had been keen to promote. The open-cockpit fighters performed well, but there was a constant need for faster aircraft capable of intercepting fast bombers, prompting the Air Ministry to issue Specification F7/30 in 1930. This called for a fighter with a maximum speed of 250mph at 15,000ft, a landing speed of 50mph, and four guns.

Several companies, including Bristol, Hawker, and Supermarine, expressed interest; however, Gloster was not initially among them because Gauntlet production occupied much of the company's resources. Revisions to the Gauntlet design by Folland resulted in an aircraft that could be a suitable contender for F7/30. The Bristol Mercury engine was retained, but the wings were refined to strengthen them. The undercarriage was modified so it no longer required supporting struts or wire bracing, and a large cooler was added to the outside of the starboard fuselage. The Gauntlet had two guns fitted in the fuselage, with two additional guns mounted in pods under the lower wings.

Despite being a late contender, it was a timely entry as none of the other entries were able to meet the requirements; the Westland F7/30 only managed a top speed of 146mph, and both Hawker and Supermarine had begun focusing on their new advanced monoplane designs. The latter two would not be ready until 1937 at the earliest, and an interim solution was still required.

The Gloster S.S.37 was chosen to fill this stopgap role and fitted with the Mercury IV, it first flew on September 12, 1934, with F/Lt Sayer in control. Upgrading to the Mercury VI produced a top speed of 242mph, still short of the required 250mph, but it was adequate. The following April the prototype received the serial K5200 and was sent to A&AEE for evaluation.

Folland continued work on the design and introduced a sliding closed-canopy cockpit. The Mercury was again upgraded to the IX, and on July 1, the S.S.37 officially became the Gladiator. As events continued to unfold towards war on the continent, the Air Ministry became more aware of the urgent need to rearm the RAF, placing an initial order for 23 aircraft in July, followed by a further order for 120 in September to equip 14 squadrons, with deliveries beginning in 1936.

72 Squadron, based at RAF Tangmere, was the first to receive the Gladiator in February 1937 having just been re-formed. It is interesting to note that by the time it entered service, the biplane was already obsolete, as the Hurricane had flown in late 1935 and the Spitfire in May 1936. However, these aircraft were still a long way from front-line service though so the Gladiator would fill the role until then.

A few weeks after 72 Squadron, 3 Squadron took delivery of their first three Gladiators, followed by 80 Squadron, which continued to operate the Gladiator until March 1941. A move to the Middle East shortly after receiving the Gladiators was a major factor in their continued use. Deliveries continued during the next two years, with eight squadrons ultimately being equipped with Gladiators, some aircraft being transferred to other squadrons. In total, 38 RAF squadrons used the aircraft; this does not include the 23 Fleet Air Arm squadrons or the Meteorological (Met) and training flights, which also used Gladiators in various roles.

As the number of Gladiator squadrons increased, it was becoming clear that the aircraft could still be improved. A yet more powerful version of the Mercury was available – the VIIIA – which was the first to have a manual boost option and provided a new top speed of 257mph. The cockpit instrumentation was upgraded, and the Vokes filter was added for those operating in hotter climates. Trials by A&AEE using K7922 with both the two-bladed wooden Watts propeller and the three-bladed metal Fairey-Reed propeller were undertaken. Once in service, the three-bladed prop was primarily used on the Mk.II, but during service, they were interchangeable.

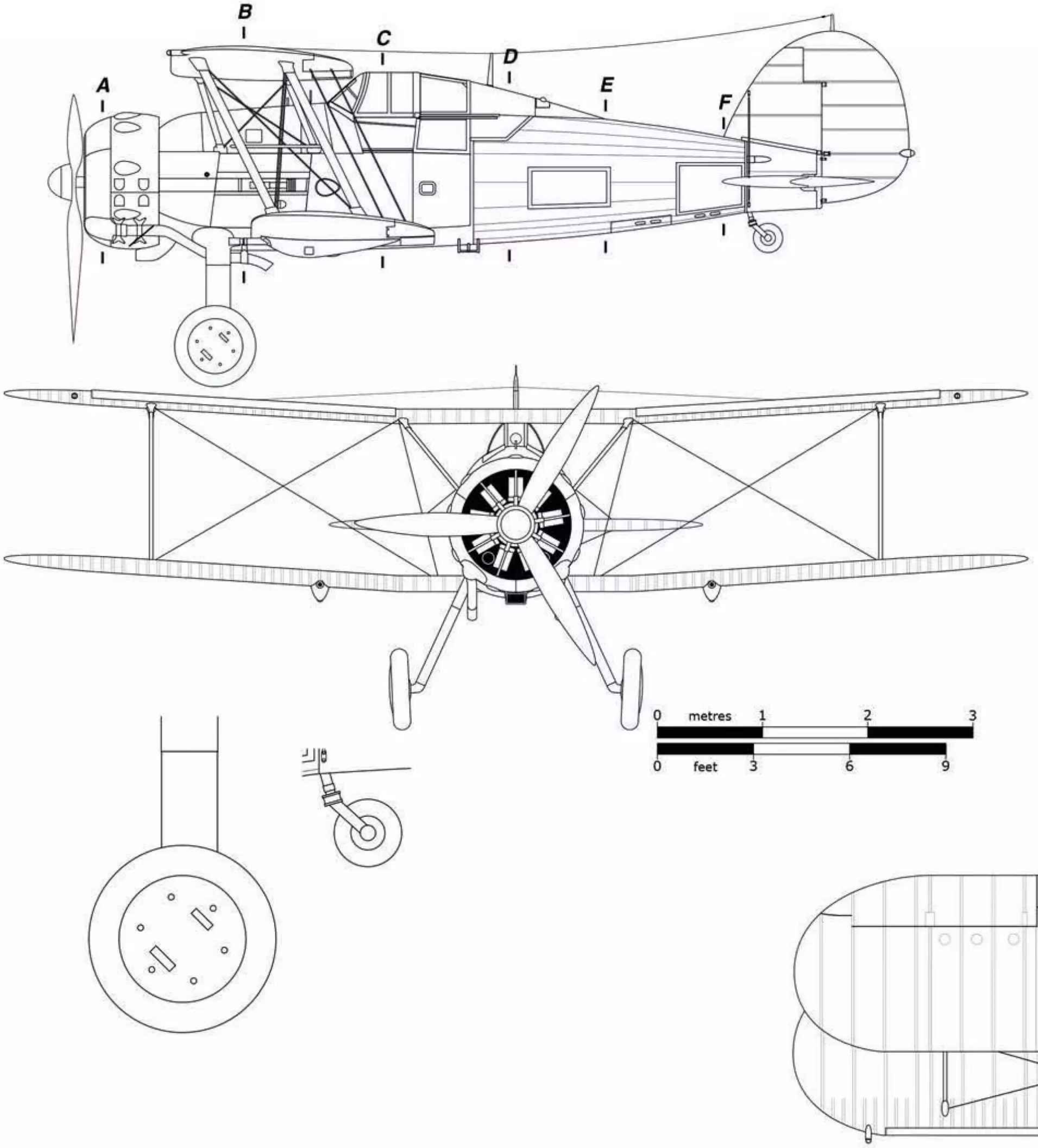
With the outbreak of hostilities, the British Expeditionary Force (BEF) was sent to bolster French defences and Air Chief Marshall Hugh Dowding was reluctant to risk any of the new Spitfires, foreseeing a need to keep them in reserve for the defence of Britain should France fall, but the Gladiators were considered expendable so 607 and 615 Squadrons joined the BEF at Merville on November 15, 1939. During the Phoney War, they saw little action, although UK-based squadrons did intercept Luftwaffe aircraft during the winter, 263 and 152 Squadrons both engaging the enemy.

To further extend resources, 263 Squadron was sent to Norway following the German invasion on April 18, 1940. Flying from Filton to Scapa Flow, they were based on HMS *Glorious,* which left two days later. Upon arrival, they operated from a frozen lake and were later joined by 18 more Mk.IIs to make up for the losses sustained. During the retreat, ten of the pilots landed their Gladiators along with the Hurricanes of 46 Squadron back on HMS *Glorious* after a final patrol on June 7. The next day, the carrier and her escorts were sunk by the *Scharnhorst* and *Gneisenau*.

In May 1940, the two squadrons based in France were involved in heavy action during the Blitzkrieg and the withdrawal of British forces. On May 10, 607 Squadron claimed seven enemy aircraft before breakfast. Some Gladiators were lost in combat, but a significant number were destroyed on the ground when Vitry-En-Artois was bombed. The survivors were then destroyed by the British themselves to prevent them from falling into the hands of the enemy.

Only one Gladiator squadron took part in the Battle of Britain: 247 Squadron was re-formed on August 1, 1940, at Roborough, Devon, to provide fighter cover for the naval ports of Plymouth and Falmouth. Since most of the combat occurred in the south-east, the Gladiators saw little action. Due to their speed and climb rate, the Gladiators had limited success, instead relying on locally based Hurricane squadrons to carry out interceptions. The unit's conversion to Hurricanes on Christmas Eve 1940 marked the end of biplane fighters in British skies.

Most of the action involving Gladiator squadrons took place in the Mediterranean and Middle East, with 30 and 80 Squadrons operating in Egypt from 1938. The following year, in Aden, 94 Squadron ➤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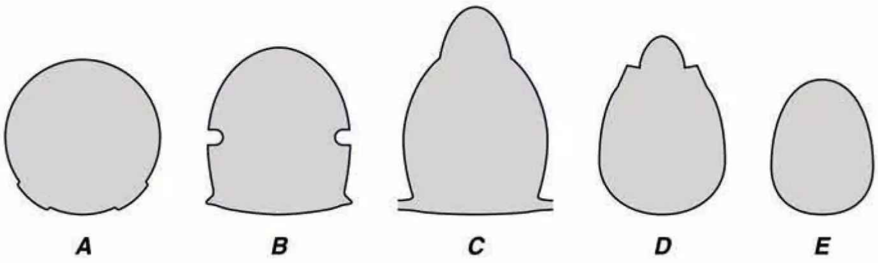
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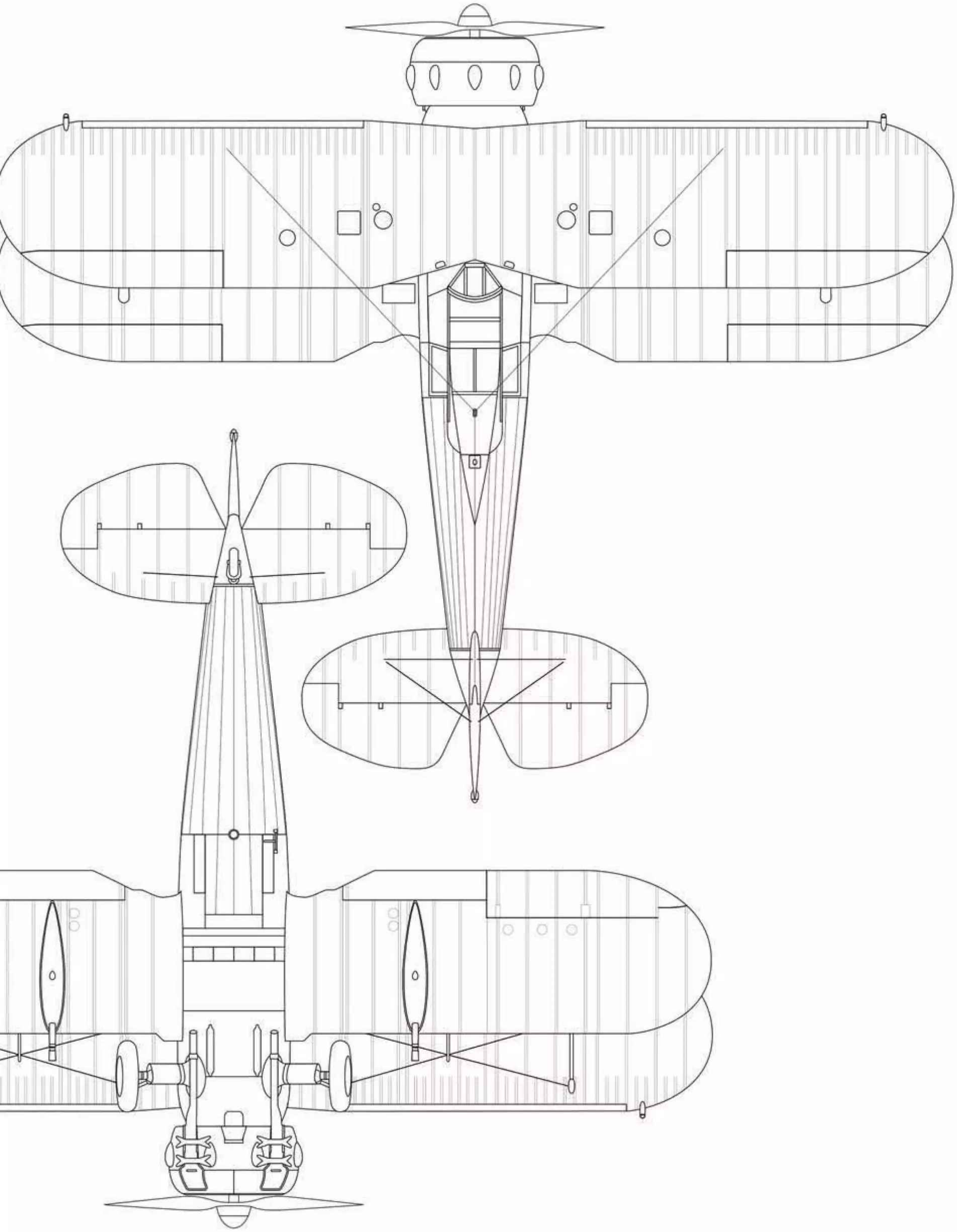
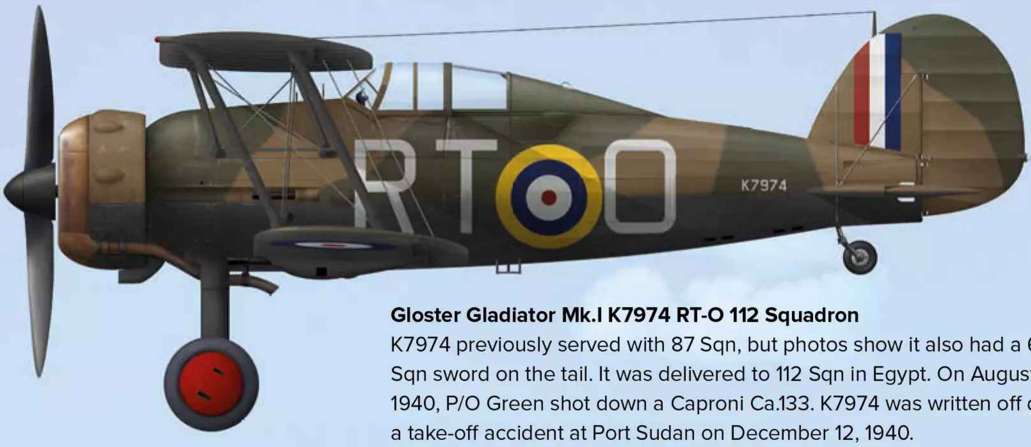
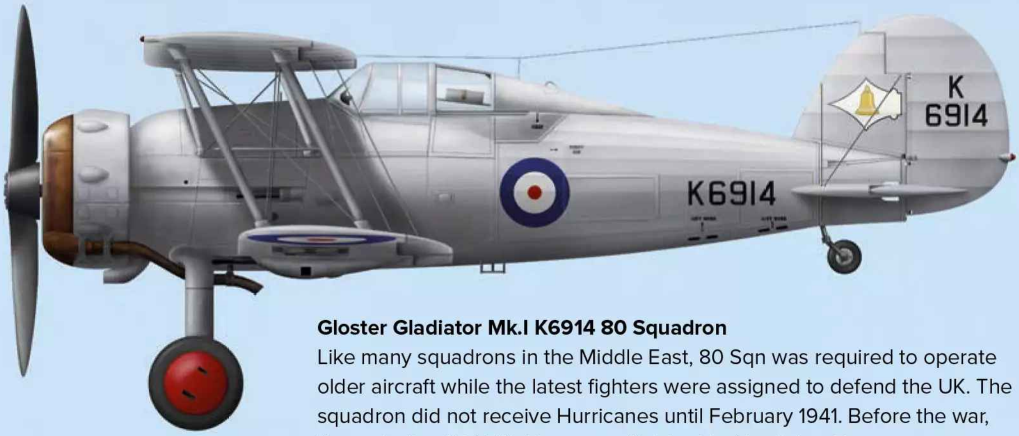
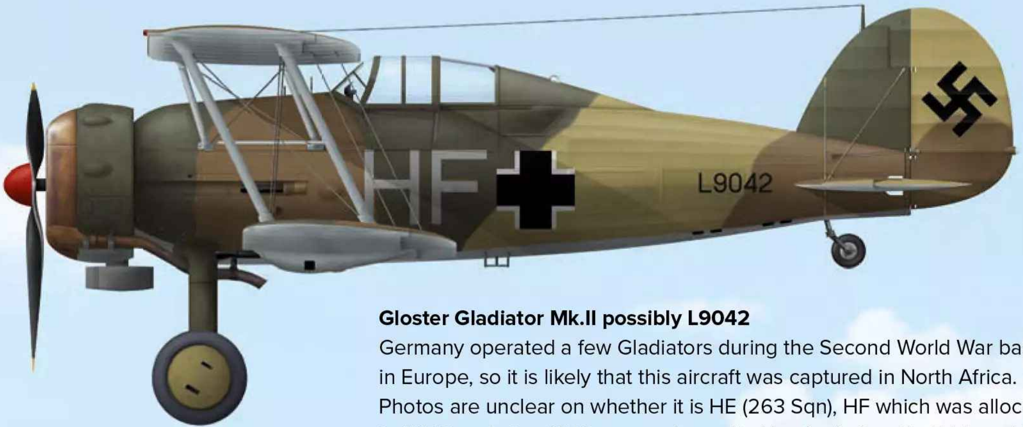




Gloster Gladiator Mk.I K7974 RT-O 112 Squadron
K7974 previously served with 87 Sqn, but photos show it also had a 601 Sqn sword on the tail. It was delivered to 112 Sqn in Egypt. On August 1, 1940, P/O Green shot down a Caproni Ca.133. K7974 was written off during a take-off accident at Port Sudan on December 12, 1940.



Gloster Gladiator Mk.I K6914 80 Squadron
Like many squadrons in the Middle East, 80 Sqn was required to operate older aircraft while the latest fighters were assigned to defend the UK. The squadron did not receive Hurricanes until February 1941. Before the war, the majority of RAF fighters were finished in Aluminium Dope.



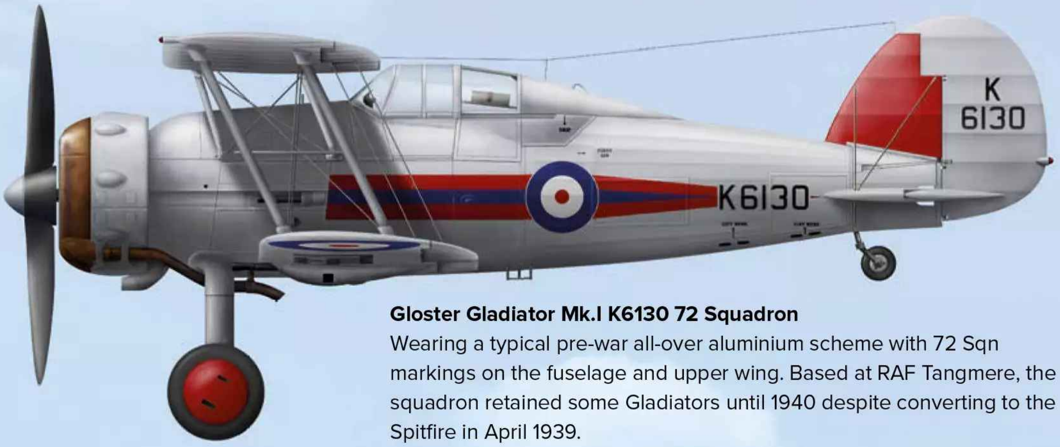
Gloster Gladiator Mk.II possibly L9042
Germany operated a few Gladiators during the Second World War based in Europe, so it is likely that this aircraft was captured in North Africa. Photos are unclear on whether it is HE (263 Sqn), HF which was allocated to 127 Sqn during 1939, or a code applied by the Luftwaffe. RAF markings on the tail appear to be painted over.

reformed with a mix of Gladiator Mk.Is and Sea Gladiators. After settling local tribal tensions, 33 Squadron was first involved in combat against Italian Fiat CR.32s and Caproni Ca.310s just four days after Italy entered the war on June 10, 1940.

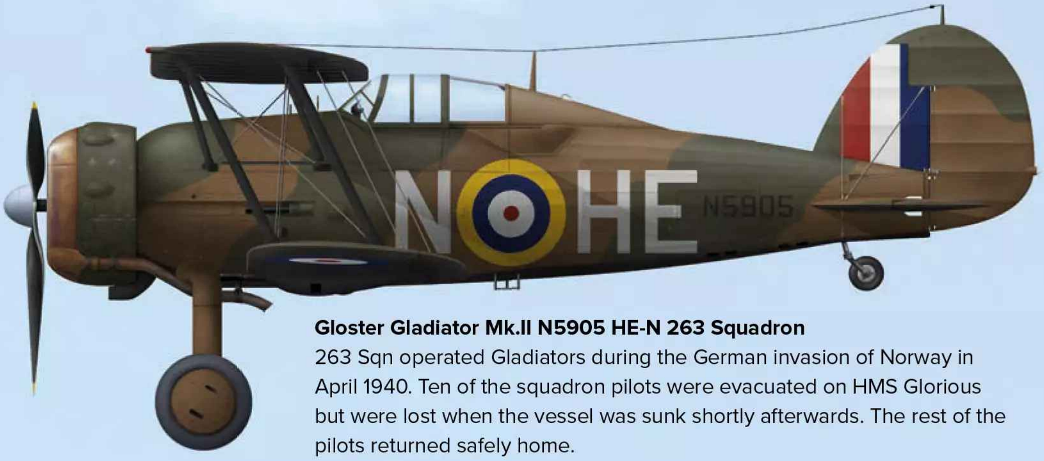
During the encounter, two of the CR.32s were destroyed. Just before 80 Squadron was relieved by 112 Squadron in Libya, a young pilot fresh from training, Roald Dahl, set out to join them. However, he crashed between the two front lines and did not join the squadron until they were flying Hurricanes in Greece. As the new aircraft filtered through from the factories in Great Britain, the Gladiators all ended up with 112 Squadron before being retired.

This, however, was not the last combat for RAF Gladiators. A British force was hastily dispatched to quash a revolt in Iraq backed by pro-Axis forces in 1941. The force included 94 Squadron, which had appropriated Gladiators that were then in storage, along with those already at the Habbaniya base, just west of Baghdad. The revolt finally ended on May 30, 1941. 127 Squadron was involved in combat against Vichy French Dewoitine D.520s, and for a brief period, 6 Squadron flew the Gladiator while waiting for their Hurricanes to be refurbished in Libya.

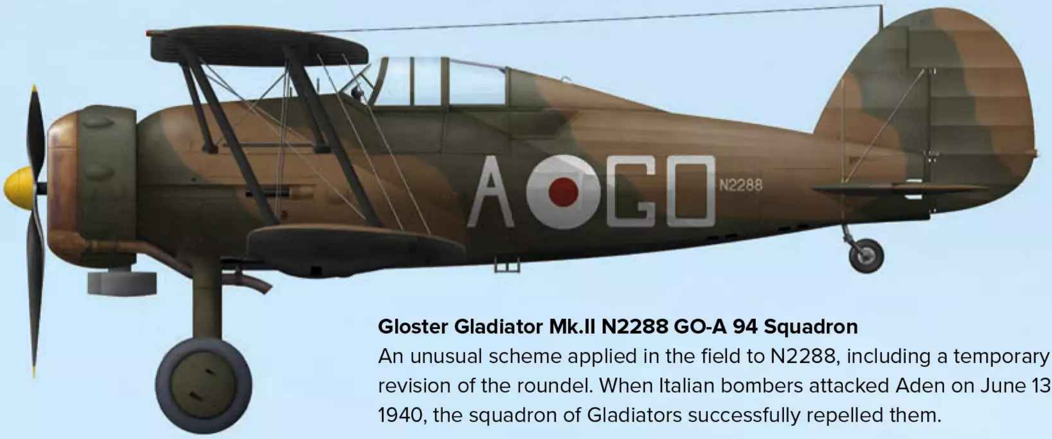
The Gladiator proved to be a reliable and rugged aircraft that was the



Gloster Gladiator Mk.I K6130 72 Squadron
Wearing a typical pre-war all-over aluminium scheme with 72 Sqn markings on the fuselage and upper wing. Based at RAF Tangmere, the squadron retained some Gladiators until 1940 despite converting to the Spitfire in April 1939.



Gloster Gladiator Mk.II N5905 HE-N 263 Squadron
263 Sqn operated Gladiators during the German invasion of Norway in April 1940. Ten of the squadron pilots were evacuated on HMS Glorious but were lost when the vessel was sunk shortly afterwards. The rest of the pilots returned safely home.



Gloster Gladiator Mk.II N2288 GO-A 94 Squadron
An unusual scheme applied in the field to N2288, including a temporary revision of the roundel. When Italian bombers attacked Aden on June 13, 1940, the squadron of Gladiators successfully repelled them.

culmination of the fighter biplane, a configuration that only 30 years earlier had been an unproven concept. However, it was just a little too late and was eclipsed by the monoplanes, which came to dominate the war. Ironically, these too would become obsolete within a decade due to the introduction of another Gloster design, the Meteor, the first RAF jet. A total of 747 Gladiators were built and served with 14 nations. Although it may have already been obsolete by the outbreak of the war, a Gladiator operated by a skilled pilot still performed admirably, earning it a respectable reputation—fitting for the last biplane to serve with the RAF. ■

For more, see:
RAF Second World War Fighter in Profile
by **Chris Sandham-Bailey**
Published by **Mortons Media Group**
Price on Amazon (Hardback £35.00)

RAF SECOND WORLD WAR FIGHTERS IN PROFILE
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CHRIS SANDHAM-BAILEY

F7U-3
129549

A close-up of the pilot's cockpit of a Vought F7U-3 Cutlass, BuNo 129549, in flight in 1955.

Who you calling GUTLESS?

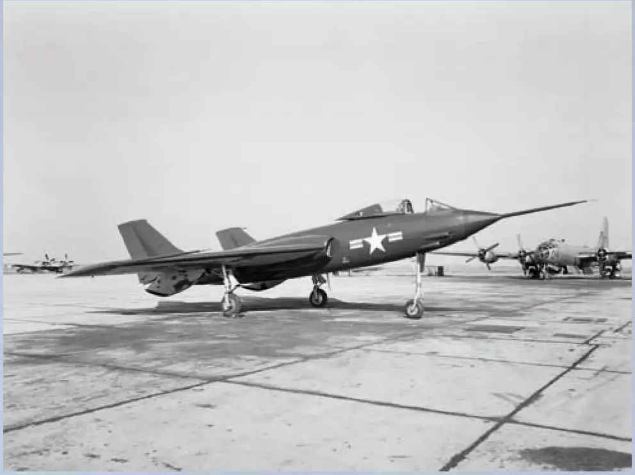
The Vought F7U Cutlass was a leap into the unknown, showcasing numerous advanced features. Sadly, it was the 1950s, and the aircraft's basic systems prevented its performance from living up to its striking appearance.

When the Second World War ended, the US was able to take advantage of the extensive research conducted by German engineers and scientists on swept-wing and tailless aircraft designs. Although the Americans already had some experience in these areas, hundreds of thousands of captured German documents provided valuable additional data.

A tailless design involved removing an aircraft's horizontal tail surfaces – the parts thought to cause the most problems during transonic flight – and swept-back wings had been shown to offer significant performance advantages.

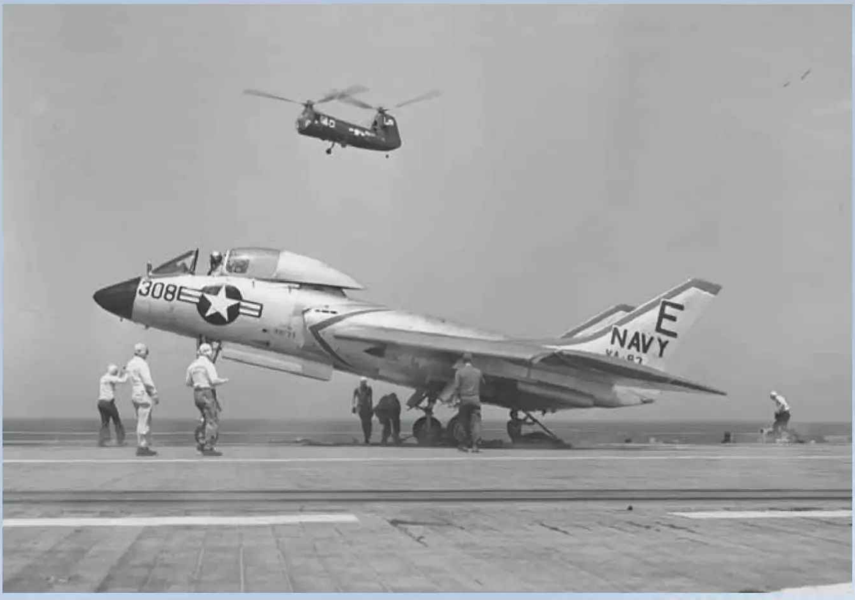
With several 'safe' and conventional designs already in progress, including the Fury, the Banshee and Vought's own XF6U-1 Pirate, the Navy felt it could take a gamble on a new and entirely unconventional design offered by Vought. Three prototypes were ordered under the designation XF7U-1 on June 6, 1946, and Vought stuck with its swashbuckling naming policy by applying the moniker 'Cutlass'.

The new aircraft's slender fuselage housed a pair of Westinghouse J34-WE-32 engines side by side at the rear fed by wing root intakes – but had no fins or tailplanes on it.



The Vought XF7U-1 Cutlass, BuNo 122472, at the NACA Langley Research Center, Virginia, on December 3, 1948.

Only the F7U-1s BuNo 124426 and 124427 were flown by the Blue Angels.



A F7U-3M Cutlass of Attack Squadron VA-83 'Rampagers' on the starboard catapult of the aircraft carrier USS *Intrepid* (CVA-11). VA-83 was assigned to Carrier Air Group 8 (CVG-8) aboard the *Intrepid* for a deployment to the Mediterranean Sea from March 12 to 5 September 5, 1956. A Piasecki HUP-2 Retriever of Helicopter Utility Squadron HU-2 Det.33 'Fleet Angels' is on plane guard duty in the background.

Instead, the aircraft's 38° swept-back wings each had a fin attached partway along their trailing edge.

The tricycle undercarriage included an unusually long nosewheel leg, which put the pilot 14ft up in the air even before take-off. An ejection seat was fitted, but this was only effective above 1,500ft.

Armament was four 20mm cannon under the cockpit in the nose, and there was no option to carry weapons or fuel tanks externally at this stage. The Navy was so committed to the Cutlass that it ordered 20 production F7U-1s on July 29, 1948, even before the type's first flight.

Vought test pilot Joel Robert 'Bob' Baker took the first prototype up for its aerial debut on September 29, 1948, and testing progressed well with the second and third prototypes following in sequence. Vought proposed a second production model – the F7U-2, powered by Westinghouse J34-WE-42 engines – on November 1, 1948. The Navy came through with an order for 88 of these.

The second prototype was lost during a test flight on March 14, 1949, over Chesapeake Bay, Maryland. Test pilot William Millar vanished into a bank of cloud, and pieces of his Cutlass washed up on the shore a month later. His body was never recovered.

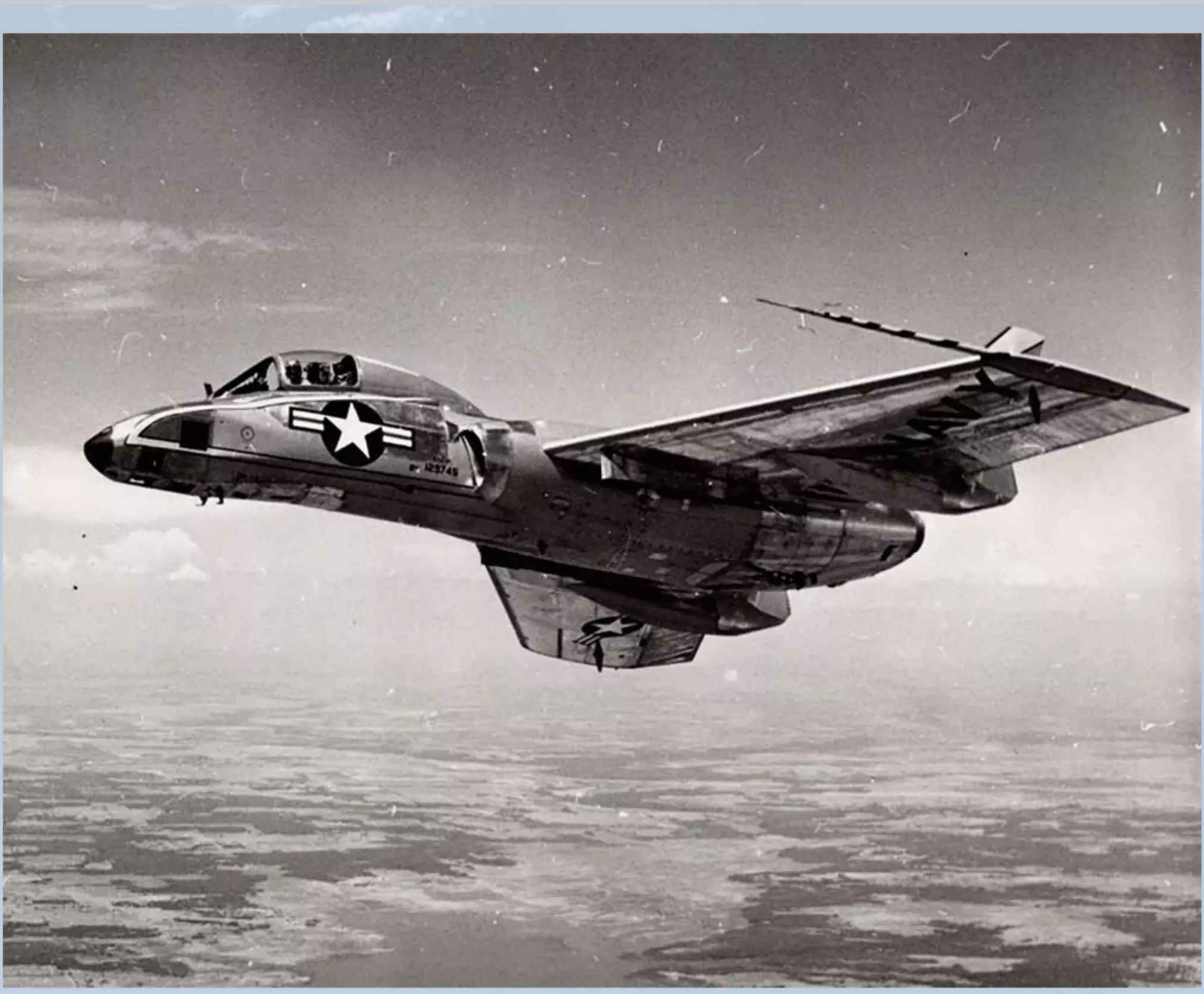
Almost a year to the day after its maiden flight, the first prototype was also destroyed. Test pilot Paul Thayer overcorrected for a crosswind on take-off while carrying a heavy asymmetrical load on September 28, 1949. The aircraft's port wing dipped until it hit the ground to the left of the runway. After spinning around 100°, it slid 750ft across the ground, its fuselage breaking away forward of the engine intakes. Thayer escaped with cuts and bruises.

The first production F7U-1 flew on March 1, 1950. It had been hoped that the F7U-1 would be powered by Westinghouse's afterburning J46, but this engine was unavailable, so the J34 continued to be used – along with 565kg (1,245lb) of ballast to simulate the bigger, heavier powerplant.

Only 14 of the 20 F7U-1s ordered were actually built, and two of them crashed during test flights at Vought's factory. The Blue Angels demonstration team briefly flew two more during solo displays, but this activity was soon curtailed due to a lack of spare parts. The remaining ten were used for carrier take-off and landing tests from June 24, 1950, to August 14, 1951. The third and last surviving prototype was destroyed after catching fire mid-air during an air show on July 7, 1950.

During testing of the F7U-1 it became clear that Westinghouse was never going to come through with the J34-WE-42 and the F7U-2 was cancelled. However, Vought had already pitched a much more substantial upgrade as the F7U-3.

The F7U-3 retained the basic layout of the F7U-1 but was otherwise a completely new aircraft. The whole airframe was ➤



One of 12 Vought F7U-3P Cutlass reconnaissance planes built.

enlarged and strengthened. Wingspan was increased by a foot, also increasing wing area, and the landing gear was strengthened – particularly the nosewheel. The cockpit was raised even higher and redesigned to provide better visibility over the nose during take-off and landing.

Vought added more than 100 new access panels, too, making maintenance of the aircraft considerably easier, and the rear fuselage was redesigned so that the engines could be slid out rearwards. On the F7U-1, they had to be lowered from the aircraft.

The four 20mm cannon were removed from their original nose mountings and repositioned much further back, two above each engine intake. The F7U-3 could also carry a substantial payload – being capable of a catapult launch carrying a full internal fuel load plus 2,495kg (5,500lb) of external stores.

Engines continued to be a problem, however. The first 16 F7U-3s had to be powered by Allison J35-A-29s because the afterburning J46-WE-8A remained unavailable. When the J46-WE-8A did finally arrive its output was well shy of the figures Westinghouse had promised – 1,640kg (3,620lb) of thrust per engine, rising to 2,597kg (5,725lb) with afterburner. Even so, a J46-engined Cutlass outperformed both a Grumman F9F-6 Cougar and North American FJ-2 Fury in mock combat.

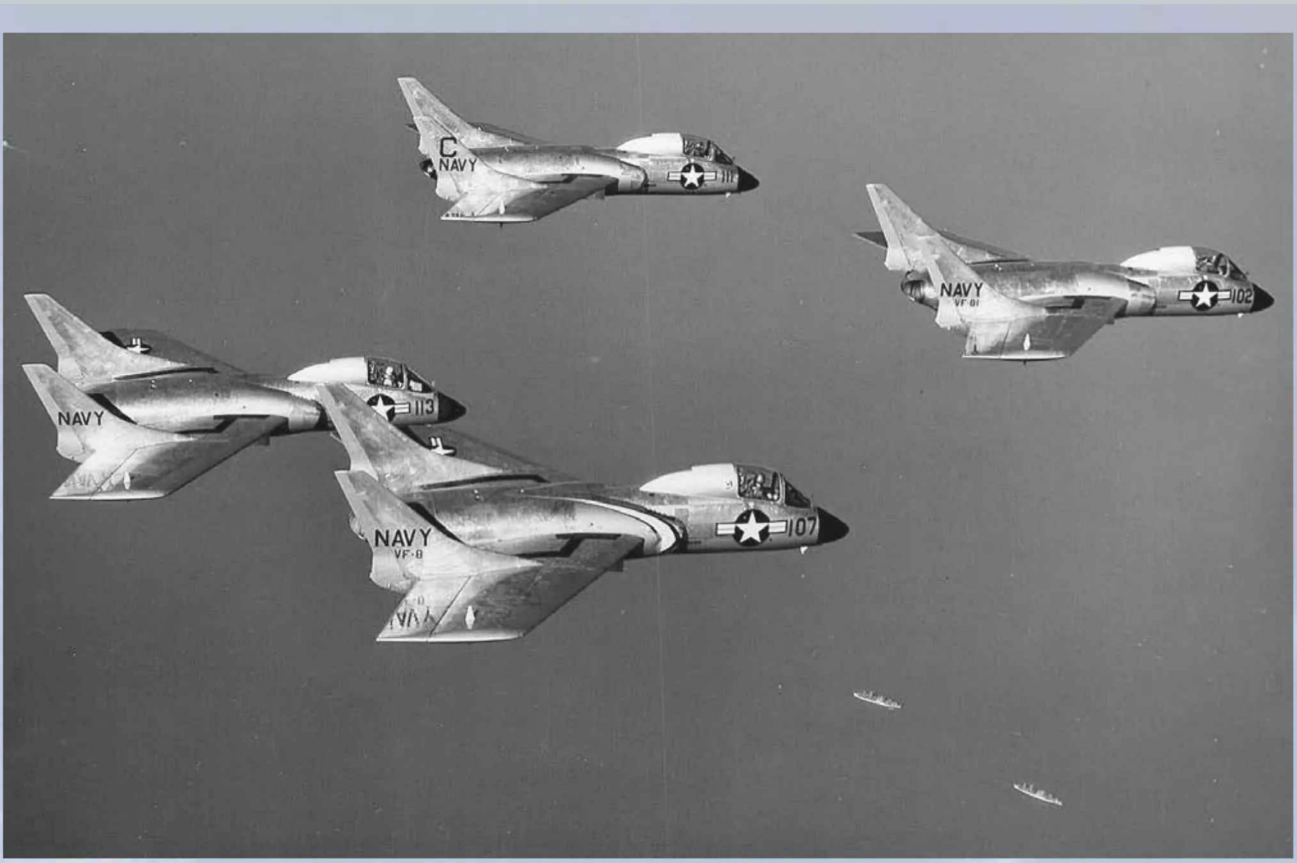
The Navy ordered 180 F7U-3s, and they were beginning to reach units by June 1954, including VF-81 and VF-83 operating in the Atlantic and VF-122 and VF-124 in the Pacific. A total of 13 squadrons would operate the type.

Ninety-eight of the 180 F7U-3s – more than half – were built as F7U-3Ms, with the ability to carry two Sparrow air-to-air missiles under each wing. They were fitted with AN/APQ-51 radar guidance systems and also could be fitted with an inflight refuelling probe.

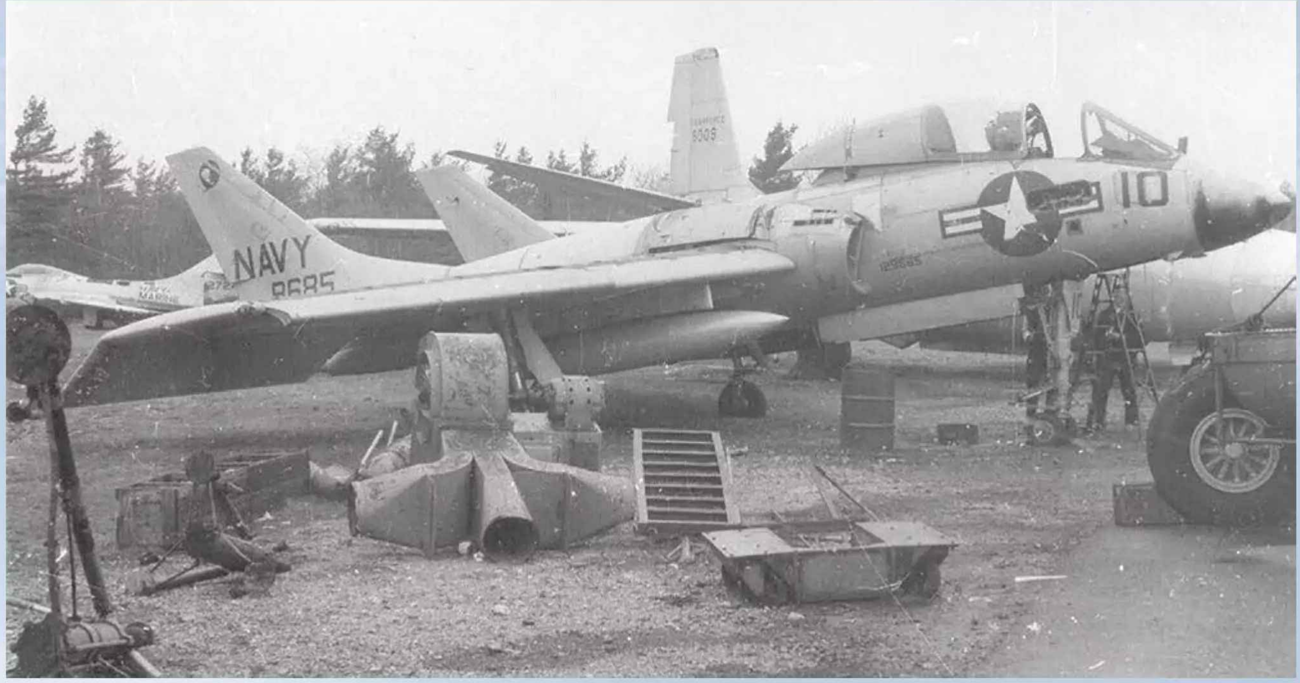
A further 12 F7U-3s were converted into F7U-3Ps for photo reconnaissance, with cameras being installed in a nose 25in longer than the original. Flare ejectors with 40 cartridges were fitted behind the cockpit to illuminate targets during night photography. These aircraft were never used in operational service but were used extensively for testing and evaluation.

While the F7U-3 Cutlass was not as ‘gutless’ and its unfortunate nickname – ‘Gutless Cutlass’ – might suggest, it was reportedly a difficult aircraft to fly, and its systems let it down. For example, its hydraulic system operated at 3,000psi, which was twice that of other Navy jets. As a result, it constantly leaked and lost pressure, leading to unresponsive controls in the cockpit.

In addition, under certain conditions, the J46’s afterburners could use up all the fuel in the central transfer tank before more could be pumped in from the full wing tanks,



Four Vought F7U-3 Cutlass of Fighter Squadron VF-81 'Waldomen' in flight near Naval Air Station Norfolk, Virginia.



Having long retired from operational service, this F7U-3 awaits its destiny, which was to differ from the rest of the Cutlass fleet. This particular aircraft is now being restored at the MAPS Air Museum in North Canton, Ohio.

resulting in a flame-out on take-off. Inflight engine fires, as previously mentioned, were all too frequent.

The heavy Cutlass was also extremely difficult to recover if it went into a spin. Overall, these characteristics resulted in a high number of life-threatening incidents and earned it another nickname, the 'Ensign Eliminator'. A total of 21 Navy pilots lost their lives in 78 accidents, and a quarter of all Cutlasses were destroyed as a result of those accidents. ■

Yaks over Königsberg

Général Charles de Gaulle sent a Free French Air Force group to serve alongside the Soviet Air Force on the Eastern Front in November 1942. This was Groupe Normandie-Niemen. By 1945, the Frenchmen were battle-hardened Yak-flying veterans about to face their sternest test – the advance on East Prussia's capital, Königsberg.

A Yakovlev Yak-3M painted in the colours of the Normandie-Niemen regiment. Deliveries of the original Yak-3 began in late 1944, but Normandie pilots were still flying the Yak-9 until early 1945. **Credit: Sebastian Tenguy**

Königsberg was a fortified city that marked the furthest eastern extent of the old German Empire. It was the capital of East Prussia and an important port on the Baltic Sea. Since 1941 it had been on the front line of the war against the Soviet Union – being repeatedly bombed by the Soviet Air Force.

Being close to the departure point for Germany's invasion of first Poland, then the Soviet Union, the city had become a centre for slavery and a collection point for looted treasures from the east.

Within and around the city were around 85,000 Polish and Soviet slaves as well as Allied prisoners of war, working in labour camps.

The summer of 1944 had also seen two devastating night raids on the city by the RAF, which destroyed the old historic town, gutted the cathedral, and severely damaged the castle and other prominent civic buildings.

Nevertheless, Königsberg held massive, fortified positions on its landward side that remained unaffected by aerial attacks. These included three defensive layers – the outermost comprising 12 fortresses connected by underground tunnels and concrete structures, a secondary ring around the city's outskirts, and the main city fortress at its centre.

All three were safeguarded by an impressive array of anti-tank positions, structures, barricades, and minefields. Furthermore, there were several other heavily fortified positions both inside and immediately outside the city.

Manning all these positions were five full divisions of German infantry – 130,000 men in total.

There was also strong support for Königsberg in the air. As of January 11, 1945, Luftflotte 6, based in East Prussia and western Poland, was the strongest Luftwaffe formation on the Eastern Front.

Luftflotte 6 boasted JG 51 with 108 Bf 109s (78 serviceable), and 86 (70) Bf 109s of JG 52. It also had two-night fighter

➤

Wir halten
Königsberg.

German soldiers' man a Pak 40 75mm anti-tank gun as part of Königsberg's outer defences in early 1945. The sign reads 'We will defend Königsberg'. When the air war resumed on the Eastern Front on January 13, 1945, many of Normandie-Niemen's missions were flown in defence of bombers heading for targets in and around the city.

units, NJG 5 and NJG 100, with 94 (76) aircraft between them, a mixture of Bf 109s and Ju 88s.

KG 55 was still equipped with 14 (10) He 111 bombers, and perhaps most notably, Luftflotte 6 had three large ground-attack units – SG 1, SG 3, and SG 77. Together, they possessed 294 (262) Fw 190 fighter-bombers, which could also serve as pure fighters if necessary, although in doing so, they were hampered by the weight of their extra armour. Additionally, 10./SG 77 still had 19 (16) Ju 87s.

There was also the night ground-attack unit NSGr. 4 with 60 (47) Ju 87s and Si 104s, the maritime reconnaissance unit SAGr. 126 with 21 (11) Ar 196 floatplanes and nine (six) Bv 138 flying boats, strategic reconnaissance units FAGr. 1, FAGr. 3, AGr. 22, AGr. Nacht and AGr. 122 with 124 (88) Ju 188s, Me 410s, Ju 88s and Do 217s, and tactical reconnaissance units NAGr. 2, 3, 4, 8, and 15 with 159 (126) Bf 109s and Fw 189s.

Finally, Luftflotte 6 could also call on a single depleted transport unit – I./TG 3 with 36 (27) Ju 52s. Overall, this amounted to 1024 (817) aircraft, of which 582 (486) were fighters.

Groupe de Chasse 3

At the beginning of 1945, the front line was less than 50 miles to the east of Königsberg. Ranged against the German forces in East Prussia were more than 1.6 million Soviet troops commanded by Ivan Chernyakhovsky – at 38 the youngest commander of an entire front during the Second World War.

His forces included large tank armies and four air armies – the 1st, 3rd, 4th, and 15th. Each of these comprised over a thousand aircraft.

Within the 1st Air Army was a highly unusual unit. The Free French Air Force's Groupe de Chasse 3 (GC3) had been sent to Russia in November 1942 at the behest of Général Charles de Gaulle. The Free French leader had set up the National Committee in 1941 as a sort of war cabinet and was determined that the Soviet Union should give official recognition to Free France.

Part of this involved offering military assistance. Soviet leader Joseph Stalin had been cautious at first, but with the formation of the National Committee, he decided to promote mutual military aid between the two nations.

De Gaulle signed the order establishing Groupe de Chasse 3 on September 1, 1942, and shortly afterwards, it was decided that the unit should also bear the title 'Normandie' so that its members would never forget that region of France and its occupation by the Germans.

By early December, the unit's pilots and equipment had been incorporated into the Soviet Air Force, and on January 19, 1943, its first fighters, six Yak-1Ms, were delivered.

The unit's first operational mission, involving 13 of the new Yak-1Ms, took place on March 22, 1943, and its first aerial victory was on April 5: Lieutenants Albert Préziosi and Albert Durand shot down a Fw 190 each in the Smolenski area. Both would themselves be killed in action later that year.

Having begun as a single escadrille or

Ground crew prepare to refuel one of Normandie-Niemen's Yak-3s.

squadron, Normandie expanded to two in August 1943 – named Rouen and Le Havre.

After eight months of incredibly fierce fighting on the front line, nine of the groupe's original 15 pilots had been killed in combat, including its commandant, Jean Tulasne. And of the 23 replacement pilots received between May 10, 1943, and the end of November 1943, 12 had been killed.

The 38 pilots had amassed 72 claimed victories between them; however, by March 1944, this total had risen to 84.

Now the groupe was expanded to a regiment, with the addition of the third and fourth squadrons – Caen and Cherbourg. Yak-9Ds replaced the Yak-1Ms, and more frontline combat quickly followed during what became known as the regiment's second campaign.

During this campaign, Stalin ordered the regiment, which operated under Soviet control and was often featured in Soviet propaganda publications such as Pravda, to adopt the name Normandie-Niemen. This was to commemorate its role in the fight to liberate the Niemen River – traditionally considered by Germany as the boundary of its eastern border.

Deliveries of a remarkable new lightweight fighter, the Yak-3, began on August 17, 1944, gradually replacing the Yak-9Ds, which continued to be used in combat until the end of the year.

By the start of 1945, the regiment had claimed 201 'kills' but had been reduced to just three squadrons due to personnel shortages. It had been stationed at Gross-Kalweitchen on Lithuania's southern edge, close to East Prussia since the end of November 1944.

Little flying took place during the first 12 days of 1945, but Normandie was relocated to Dopenen, closer to the front. On January 13, Chernyakhovsky's East Prussian Offensive commenced. His vast armies, including Normandie-Niemen, were unleashed against Germany's battered forces along the northern sector of the Eastern Front – and advanced towards Königsberg.

The first five days

The weather on the first day of the offensive was too poor, and those Normandie-Niemen patrols sent up had to turn back within minutes of take-off as dense fog covered the region.

This had cleared by the following day, however, and at 1pm on January 14, a patrol from the 1st Escadrille encountered a pair of Bf 109s near Gumbinnen, about 80 miles directly east of Königsberg.

The Germans tried to turn away, but the French followed closely behind. Sous-Lieutenant René Martin hit one with his 20mm cannon, causing it to catch fire before suddenly breaking apart in mid-air. The second aircraft dived to an extremely low altitude as Martin swung around to fire at it too, attempting to lose him by flying low over the hedgerows. However, the pilot brought himself into range for both Sous-Lieutenant Pierre Dechanet and Aspirant Lionel Menut, who each scored multiple hits on his machine and then watched as he ploughed into the ground.

Three more Bf 109s were then engaged near a railway line, but although Martin and Sous-Lieutenant Roger Versini both claimed hits, the outcome was inconclusive.

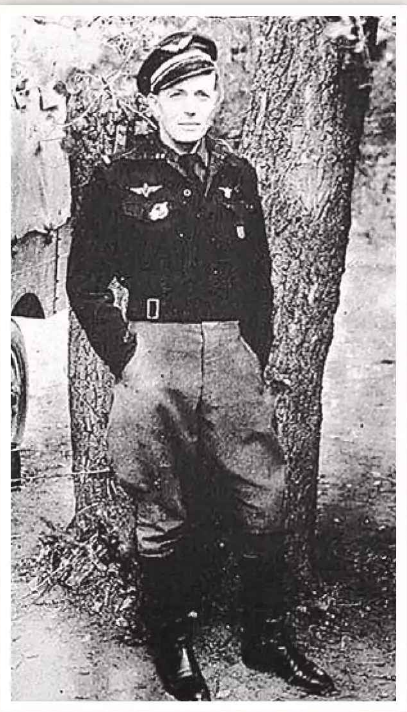
A squad from the 3rd Escadrille spotted four Bf 109s near Insterburg but then lost them. Captain Gabriel Mertzisen found them again but became separated from the rest of the squad. Despite this, he doggedly followed them unnoticed until he got close enough to surprise the rearmost Messerschmitt and fired into it from point-blank range, rapidly destroying it.

Captain Gabriel Mertzisen was among the first Normandie pilots to score a victory during the opening stages of the Soviet East Prussian Offensive, shooting down a Messerschmitt Bf 109 on January 14 east of Insterburg.

While this was happening, the rest of his squadron encountered 15 Fw 190s north of Gumbinnen and shot down two before disengaging. Late in the afternoon, as darkness descended, another Bf 109 was shot down, this time by Aspirant Charles Miquel. Returning to base, Miquel forgot to lower his undercarriage and landed his aircraft on its belly.

The commandant of Normandie-Niemen from December 12, 1944, until the end of the war was Lieutenant-Colonel Louis Delfino. He was a highly experienced pilot who had joined the Armée de l'Air in 1931 and, by the beginning of 1945, had amassed 12 aerial victories, although 10 were shared with other pilots.

Captaine Marc Charras served with the French air force both before and after the Battle of France until his unit was dissolved by the Germans in 1943. He then escaped to Spain but was imprisoned by fascists. After being liberated by the British, he volunteered to serve with Normandie. He survived the war, only to be killed in combat during the First Indochina War in 1949 – the French Vietnam War.



Sharing two 'kills' with Jacques André, Aspirant Roger Penverne was promoted to sous-lieutenant shortly before his death on February 4, 1945, aged 27. He had been engaged in a battle with 12 Fw 190s, and his aircraft was last seen going down in the Pillau region. His body was never recovered.

Snow began falling on January 15, which led to patrols being reduced to a minimum. The next day, Sous-Lieutenants Jacques André, Francois de Geoffre, Pierre Lorillon, and Aspirant Roger Penverne happened upon 12 Fw 190 fighter-bombers and launched an immediate attack. They each managed to shoot down one aircraft during the engagement.

The pilots of the 1st Escadrille encountered another dozen Fw 190s. Aspirant Léon Ougloff fired at one, which seemed to release a shower of small metal fragments, and Sous-Lieutenant Roger Sauvage hit and fatally damaged another at close range, which then dived into the ground. Then he did the same to a second. Ougloff then claimed another was blown up in mid-air.

On the way back to base, one of the 1st's pilots, Captain Marc Charras, spotted some Pe-2s being attacked by Bf 109s. Also engaged in the battle were some P-39 Airacobras. Charras teamed up with one of these to jointly claim a Bf 109.

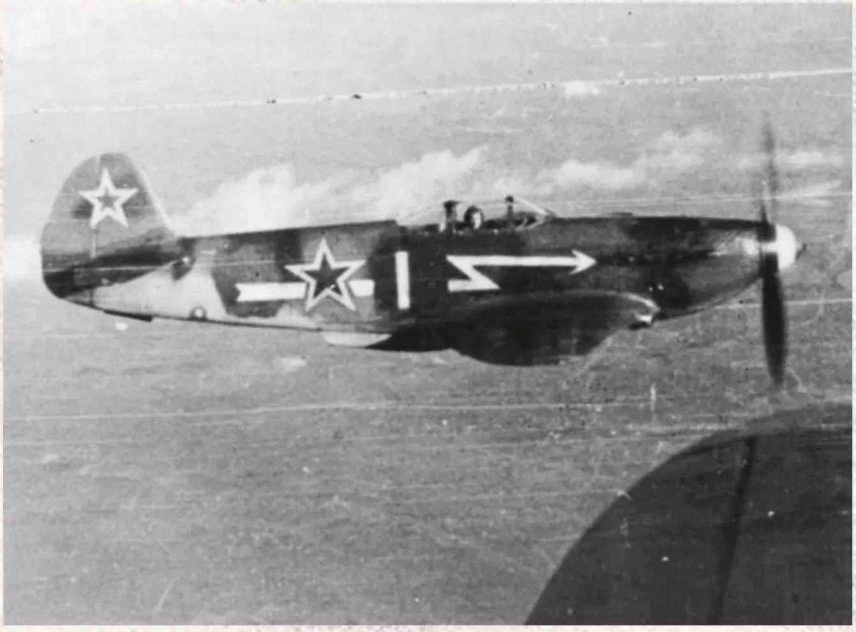
The 2nd fought still more Fw 190s, with Sous-Lieutenant Georges Lemare opening fire on one only to see the pilot immediately eject his canopy and take to his parachute. The German's wingman was shot down by Aspirant Georges Henry. At this point, Miquel was seen going down, his engine struggling and billowing white smoke.

The leader of Normandie-Niemen himself, Commandant Louis Delfino, and four other pilots then caught a large formation of Fw 190s flying at low level by surprise. Delfino dived into them and used his cannon on one at very close range, causing pieces of the aircraft to fly off and hit his left wing. What was left of the Fw 190 then fell to earth.

André, attacking close by, had a similarly frightening experience when the Fw 190 he was firing into suddenly erupted into a ball of fire right in front of him. Quick reflexes narrowly prevented the resulting large chunks of debris from crashing through his aircraft's canopy.

On a second patrol towards the end of the day, André and three comrades engaged another group of about 20 Fw 190 fighter-bombers. Once again, André poured fire into one at close range, but this time it simply dropped its bombs, peeled off, and crashed into the ground.

Aspirant Pierre Bléton, André's wingman, shot down two more. André's own total for the day was four Fw 190s destroyed and one 'probable'.



Russian by birth, Léon Ougloff's parents moved to settle in France when he was a one-year-old, and he became a naturalised French citizen in 1933. He is pictured at the controls of another pilot's Yak-3 in this rare air-to-air photograph taken by fellow Normandie pilot Roger Sauvage. The aircraft in question was the regular machine of Capitaine René Challe. When the photo was taken, some time in March 1945, Ougloff and Sauvage were flying over Königsberg.

There were several Luftwaffe airfields around Königsberg at the start of 1945, but all were destroyed by heavy and relentless Soviet bombing.

There was no let-up the next day, January 17, 1945, as the battle continued on the ground below – the depleted German forces fighting a desperate delaying action against overwhelming odds. The Soviets encountered heavy casualties and were making only painfully slow progress.

During a morning patrol, a squad of four from the 1st Escadrille found 12 Fw 190s strafing Soviet positions and ploughed into them. Captaine René Challe severely damaged one fighter and saw it go down before a second caught him in its crosshairs and blew a hole in his Yak, wounding him in the left arm. Sous-Lieutenants Robert Marchi and Robert Iribarne each destroyed another Fw 190.

During a second patrol that caught up with some Fw 190s just as they were starting their bombing run, Sauvage shot down yet another in flames – its pilot successfully bailed out.

This time though, it was Normandie's turn to be surprised. A formation of 20 Bf 109s appeared and attacked – sending Sauvage's comrade Aspirant Jean Piquenot crashing to his death. Captaine Charras was also lost, missing in action.

Flying had to be curtailed in the afternoon as a fierce snowstorm swept in and made further missions impossible.

After three days of intense combat, January 18 began relatively peacefully – the morning being written off due to heavy fog. Flying commenced early in the afternoon. Not far from Kussen, Captaine Pierre Matras and de Geoffre caught up with a formation of four Fw 190s and managed to down two of them.

On a separate patrol, Sous-Lieutenant Gaël Taburet scored a third. During another sortie with the 1st Escadrille, Sous-Lieutenant Marcel Perrin shot down one Fw 190 and damaged another before the remaining eight Fw 190s from the formation closed in on him and forced him to retreat. His comrade, Aspirant Pierre Genès, was killed when the Luftwaffe pilots shot his Yak to pieces.

Delfino led a squad comprising Sous-Lieutenant Pierre Douarre, Mertzisen, Penverne, and Bléton against 20 Fw 190 fighter-bombers, only to be engaged by another 20 that were flying escort. The French quickly withdrew as the fighter-bombers dived away, but Douarre managed to catch up with a straggler and shot him down about three miles northwest of Insterburg.

Later in the day, Charras made a surprise appearance at Normandie's base. He had evaded the Bf 109s of the previous day and then spotted one flying on its own.

He caught the German pilot by surprise, who saw him at the last instant and dove to the ground, trying to escape at treetop height. Charras told his fellow pilots that he had been about to open fire when the Bf 109's wingtip hit a branch, causing the aircraft to spin into the ground.

In the afternoon, Lieutenant Robert Castin, André, Bléton, and Sous-Lieutenant Maurice Challe went on another patrol. Once again, they encountered a large group of bomb-laden Fw 190s heading towards the front. Challe damaged one, but then part of his fairing came off, forcing him to return to base – a common issue with the lightly built Yaks.

Bléton chased two, shooting one down and damaging the other, while André saw something very strange happen. He was pursuing a pair of Fw 190s and was about to open fire when his target suddenly opened fire on his comrade. The second Fw 190 burst into flames and crashed.

Hardly able to believe his eyes, André double-checked that the aircraft he was ➤

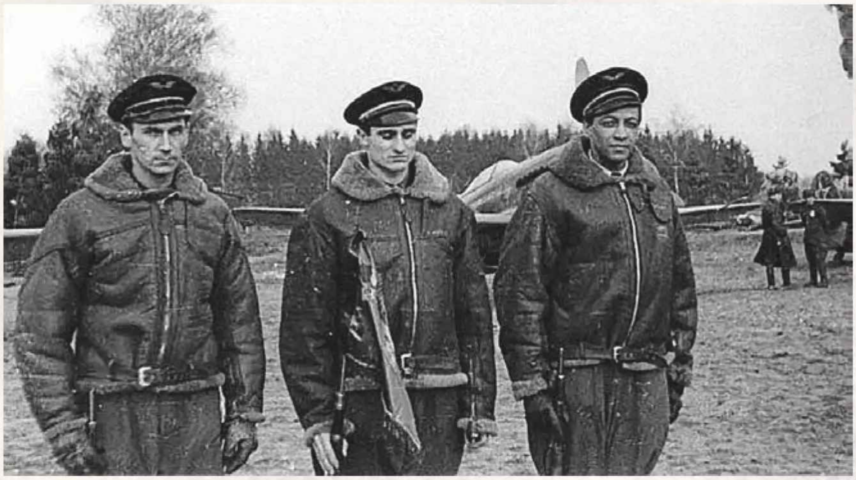
following was, in fact, a Luftwaffe liveried Fw 190, and when he saw that it was, he opened fire.

The German fighter started to belch out smoke, but André had to abort before finishing the task. Meanwhile, Castin spotted an Il-2 being attacked by an Fw 190. He flew in, guns blazing, forcing the German to break off the attack – only for a second Fw 190 he hadn't seen to shoot his Yak's engine dead. He was forced to make a belly landing near Naumiestis in Lithuania.

On January 19, a squadron from the 1st Escadrille encountered another 20 Fw 190 fighter-bombers, escorted by a further 20 Fw 190s, and while Charras claimed one, Sauvage claimed two.

A short while later, André, Challe and Bléton saw a trio of Henschel Hs 129s tankbusters flying in formation at low altitude. Attacking together, they shot down two of them, but the other one escaped.

Sauvage was active again during his second patrol of the day – attacking nine Fw 190s with Iribarne, Marchi, Perrin, and Taburet. He shot down one initially, then took another with Iribarne's help. Marchi destroyed a third, and Perrin and Taburet together claimed a fourth. Finally, Perrin shot down a plane that seemed to have already been damaged elsewhere.


Three of Normandie's top-scoring pilots together, from left: Sous-Lieutenants Georges Lemare (13 victories), Jacques André (15), and Roger Sauvage (16). The photo was taken during a parade for Soviet generals on March 20, 1945.

That evening, the regiment heard that Stalin had mentioned them in his order of the day.

Breakthrough

Bad weather hampered operations again on January 20 and on January 21, but the Normandie pilots heard that Soviet forces had finally broken through into Silesia and were closing on Breslau. At midnight, they heard that, far to the south, the Red Army had also entered Tannenberg, Saxony, inside the German border.

Snow continued to fall on January 22 and 23, with fog taking over the following two days. The next day, Normandie moved

The final battle for Königsberg involved fierce street fighting. The German defenders erected barricades across streets and dug trenches in the city's markets when the outer defences collapsed.

to another small airstrip, this time at Gross-Skajsgiren. The move was completed by the end of January 27, and operations could finally resume on January 28.

During the first patrol of the day, in the Königsberg region, Matras and de Geoffre spotted a pair of Fw 190s and went after them. The Germans fled, but the Frenchmen caught one and shot it down. Instead of exploding, spinning, or otherwise coming apart, the Fw 190 reportedly skidded 650ft on its belly before coming to a stop.

A second patrol tangled with three Fw 190s but without success, and a third found just a single Fw 190. Three Normandie pilots claimed hits on it but later acknowledged that the aircraft was being flown so skilfully that it was difficult to get near it.

Patrols resumed on January 29, but without encountering any enemy. January 30 was another write-off due to appalling weather, but the snow cleared enough on January 31 to allow a strafing mission against the German airfield at Gross Kubuiken, resulting in a Ju 52 being destroyed on the ground.

The German 4th Army had been pushed back to the Baltic, where Soviet forces then encircled it, trapping it against the shores of the Vistula Lagoon in East Prussia in what became known as the Heiligenbeil Pocket. With these battered divisions now contained, the Red Army continued its relentless push westwards into northern Germany.

Sustained bombing by the Soviets, following several heavy raids by the RAF, left most of Königsberg in ruins at best, or at worst, an endless sea of rubble.

Meanwhile, what remained of the 3rd Panzer Army had been pressed into Königsberg and Samland – the peninsula northwest of the city.

A thaw arrived on February 1, bringing mud and heavy rain. Despite these conditions, Normandie conducted several reconnaissance missions over Königsberg. Two days later, strafing missions targeted the airfield at Gross Kubuiken, and on February 4, Penverne was shot down and killed during an encounter with 12 Fw 190s. On February 5, Normandie was relocated to Powunden, about 12 miles directly north of Königsberg.

The rain then intensified until the clouds finally relented on February 10. The first patrol saw Matras, de Geoffre, and Lorillon all firing at a Fw 190, one of a group of six, which soaked up their bullets and caught fire but did not go down.

On the second patrol, Perrin, Henri, and Lieutenant Maurice Guido teamed up on a Bf 109 that was attempting to escape with a comrade and watched it crash into the ground. Another four Bf 109s were sighted north of Bladiau, to the southwest of Königsberg. Sauvage and Taburet hit one but saw it vanish into the clouds, while Charras struck another on its left wing. Sauvage and Marchi then pursued this damaged aircraft towards Pillau before Marchi finished it off, watching it crash.

On February 11, Iribane was shot down and killed by a Fw 190. Guido shot down a Bf 109 after interrupting a large turning dogfight between a large force of Messerschmitts and Yaks from a different unit. Martin finished off another, and Perrin took a third. Aspirant Maurice Monge failed to return.

Two more days of poor weather followed, and on February 14, Normandie relocated to Wittenberg – a former well-established Luftwaffe airfield almost directly south of Königsberg, rather than a muddy airstrip. However, this meant that although it could boast concrete buildings, hangars, and properly constructed runways, much of the infrastructure was in ruins and booby-trapped. Soviet sappers took over 12 hours to disable all the German devices, detonating several where they had been laid because they were in such a hazardous condition. ➤

Whenever Normandie was called upon to demonstrate its aerial prowess, its commanders summoned Sous-Lieutenant Roger Marchi. A lieutenant from March 1945, Marchi is pictured here in the cockpit of his Yak-3. One of Normandie's highest-scoring aces with 13 victories, seven of them shared, he was renowned for performing incredible aerobatics that wowed even his fellow pilots.

Chaotic scenes as viewed from the Tower of the Don in Königsberg during the final stages of the siege. Königsberg was a vital port, but few could escape the city by water as the Soviets advanced in early 1945.

Operations recommenced on February 15 and although the first three patrols encountered no enemy activity, the fourth found a dozen Fw 190s preparing to attack some Il-2s. They were caught napping, and Lemare got one straight away, then damaged a second.

Sauvage and Aspirant Joseph Schoendorff worked together to turn another into a ball of fire, crashing with its left wing shot to pieces.

Despite the earlier thaw, a snowstorm then erupted, and only a few more missions occurred before February 20. That day, there were several uneventful patrols, but during one, 12 Bf 109s appeared and immediately shot down Bleton, who managed to bail out.

Now, with only 24 pilots available, Delfino decided to reduce Normandie to just two escadrilles – dissolving the 1st and redistributing its pilots to the remaining two. The next day, Monge reappeared and explained that he had run out of fuel before he could return to Normandie's airstrip. After crash-landing, he was forced to travel on foot to rejoin the unit, which had taken all of ten days.

The big freeze lasted from February 22 to 25, when it was announced that Normandie would be relocated once more, this time to an airstrip at Friedland. This occurred on the same day without incident, despite the icy conditions.

Normandie was temporarily stood down the following day due to the ongoing manpower shortage and the terrible weather. This lasted until March 7.

At 11am, the Soviet General Staff abruptly announced that Normandie would resume operations that day, and the ground crew immediately began clearing snow from the runway. This left just enough time for four patrols to offer a few minutes of coverage over the front line, which was about 190 miles to the west in the Elbing region of West Prussia.

The following day, Normandie provided cover for Pe-2s bombing the Braunsberg area inside the Heiligenbeil Pocket. During the third patrol, a group of 12 Fw 190s intercepted the Pe-2s and began attacking them. Pierrot fired on one, which dived away slowly, trailing smoke; the pilot made no attempt to control it—leading André, who saw this, to later believe the pilot had been shot dead.

He also saw a Fw 190 alone, being chased by the Yaks of Challe, Ougloff and Lorillon.

Challe fired a burst but then realised he had an oil leak and peeled off. Lorillon took a shot and then saw that he too had an oil leak. Ougloff could not target the Fw 190 and it sped for home at extremely low altitude out onto the waters of the Frisches Haff.

March 9-24 passed without contact with the enemy – for much of that time the Friedland runway was in a poor state and all but unusable. At last, on March 25, the day dawned to clear blue skies and the runway was clear of ice and mud. Several patrols were flown, with André and Challe taking on three Fw 190s close to Königsberg at Pillau. The former managed to down one of them, which crashed into the sea.

On March 26, the second patrol of the day was set upon by half a dozen Fw 190s. During the lengthy dogfight that followed, Marchi damaged one of the enemy machines but then suffered a mechanical failure and was forced to crash-land his aircraft in a field near Normandie's airstrip. Monge was shot down and killed during the encounter.

During the fourth patrol, Perrin and Guido saw a pair of Bf 109s harassing an Il-2 before setting it on fire and speeding away when it crashed. They gave chase but the Messerschmitts initially outpaced their Yaks. They eventually caught up, however, and Guido destroyed one of them.

It was decided on March 27 that sorties should only be flown in force, with the first mission of the day comprising 16 Yaks. Intended as an escort run, the Pe-2s never appeared, so it turned into a patrol over the Pillau region.

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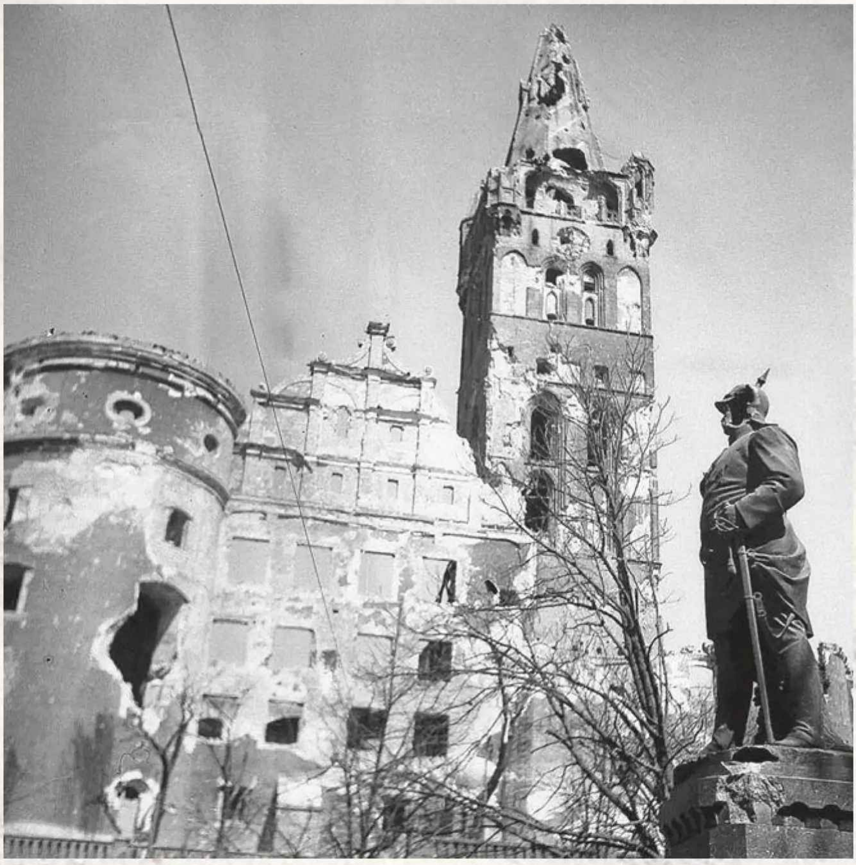
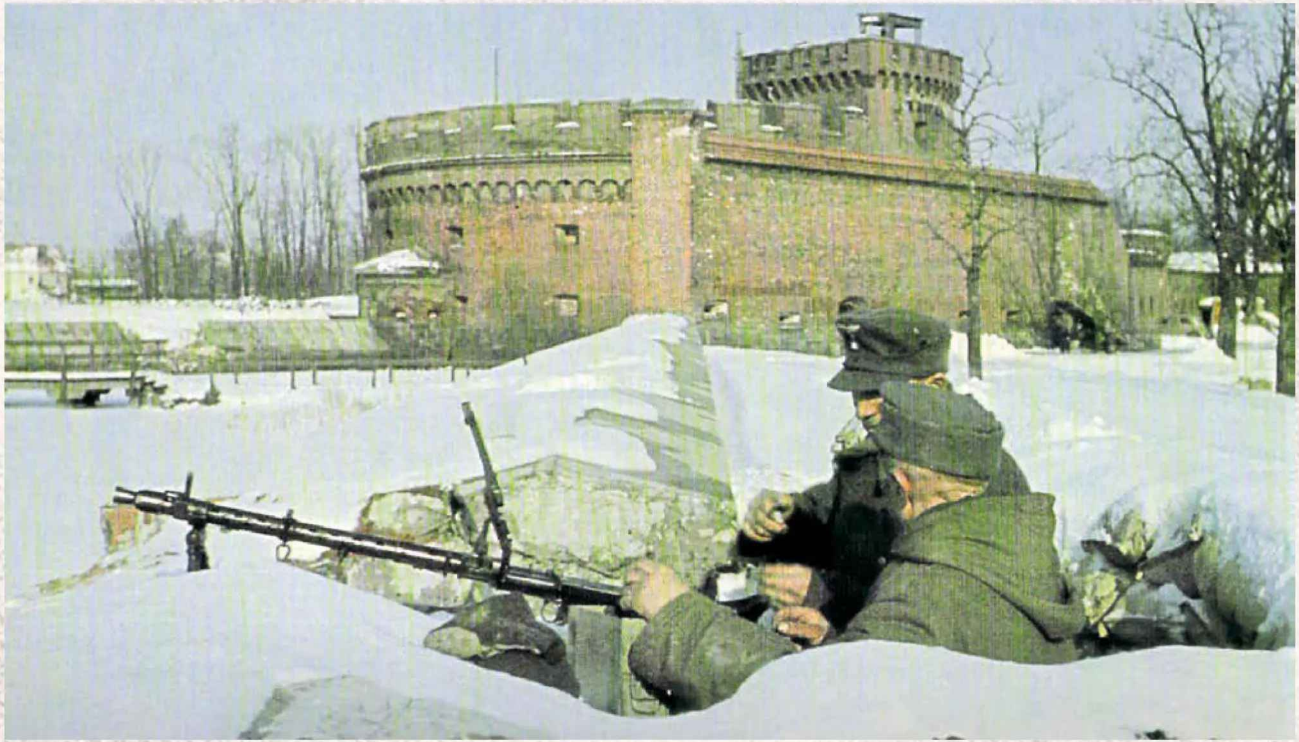


The central castle in Königsberg was destroyed during the fighting. In the foreground on the right, a monument to Bismarck can be seen, which, by accident or design, has been shot in the head.

Sous-Lieutenant Jacques André was one of Normandie's most successful pilots. During the third day of the Soviet advance along the 3rd Belorussian Front, he shot down four Focke-Wulf Fw 190s single-handedly and claimed another 'probable' in the Gumbinnen/Kussen area.



Another defensive position beside the Tower of the Don in Königsberg. The city's many historic fortifications and strongpoints were stormed, captured, or destroyed during the final battle, in which the city was attacked from all sides, including from the air, in April 1945.

Several Bf 109s and Fw 190s were encountered, and sporadic dogfights broke out. Dechanet crippled an Fw 190, which then fell into the Frisches Haff, but in return, de Geoffre went down. He had been flying parallel to the coast when his aircraft began to shudder violently, and then his engine caught fire. When it finally stalled, he had no option but to bail out. As he tried to leave the cockpit of his stricken machine, he discovered that his right leg was caught in his harness. Freeing himself with only seconds to spare, he jumped, opened his parachute, and then smacked into the freezing cold water.

His aircraft hit the water, sank instantly, and he swam to the shore despite pains from his leg. Soviet soldiers then picked him up, giving him a swig of vodka and basic medical attention.

The second patrol of the day comprised 10 Yaks and was again flown over Pillau. Contact was made at 13,000ft – high altitude for aerial combat on the Eastern Front – and Delfino opened fire as he climbed into a formation of eight Fw 190s, hitting one.

This aircraft then dove straight into the guns of Perrin, who destroyed it and watched the wreckage crash into the sea far below. Lemare and Schoendorff spotted a Bf 109, and Lemare shot it down.

As daylight waned, Guido took part in a five-aircraft patrol but failed to return. Marchi fired at a Fw 190, which was then finished off by Henri after a lengthy chase. Sauvage and Ougloff destroyed another aircraft together, with Lorillon downing yet another which then crashed onto the shore.

When the pilots finally returned to base it was realised that Challe was no longer with them.

The next day, Guido arrived at Normandie's airstrip. There was a celebration because everyone believed he was dead. It turned out that he had merely experienced engine trouble and was forced to land somewhere else – the area was not short of Soviet-controlled airbases.

The final battle

On March 31, Normandie was ordered to occupy the airfield at Bladiau, southwest of Königsberg, but poor weather conditions prevented the move. It was not until April 7 that the weather cleared enough for the unit to complete the transfer.

Bladiau was near the southern shore of the Frisches Haff, the lagoon just west of Königsberg. On the water, Pillau could be seen – a seaport on a narrow spit to the north – southwest of which lay Pillau-Neutief airfield, where the Bf 109 G-6 and

In honour of Normandie's achievements, Stalin himself presented the new French government with 40 Yak-3s. They are pictured here at Le Bourget in Paris.

G-14 fighters of III./JG 51 were stationed.

To the north-east, a vast column of black smoke could be seen rising from Königsberg – a clear sign that the ground assault was already well underway.

Having arrived, the Normandie pilots began patrols immediately. A four-strong squadron, comprising André, Sauvage, and Ougloff, with Capitaine Charles de La Salle bringing up the rear, was flying over the sector towards the city at 11,500 ft during the afternoon when André spotted four Fw 190s flying east towards the battlefront at 5,000ft.

Diving to attack, the three aspirants flew into a wall of heavy flak and were forced to break off. The Fw 190s escaped in the confusion that followed.

Moments later, André managed to spot them again and this time dived down, accompanied by de La Salle. The French pilots noticed that the German aircraft, flying in a straight line, were still carrying bombs under their fuselages, which meant they had not detected the threat.

This situation only lasts a few seconds, though, as de La Salle flew in too fast and caught the Fw 190 pilots' attention. Seeing the threat, all four dropped their bombs and attempted to flee. André closed in, chasing one of them towards the north-west of Königsberg. He fired four bursts of gunfire at it, but once again, extremely heavy flak forced him to disengage, and he never saw what became of his intended victim.

Then the weather closed in again. Schoendorff, who had been flying with another patrol, became lost and was forced to land about ten miles from Bladiau at Normandie's old base of Wittenberg.

Meanwhile, Normandie's DC-3 had been busy transporting the regiment's staff and supplies from Friedland to Bladiau. At 7pm, Normandie personnel went to their quarters in the only three nearby houses that had not been destroyed by bombing, only to have their dinner interrupted by a massive bombardment over the Frisches Haff at Pillau.

Wave after wave of Petlyakov Pe-2s and Il-2s bombed the seaport and nearby airfield and several Normandie pilots went outside to watch.

The following day, three patrols were sent out but found no targets – probably not surprising given the heavy bombing the night before. However, towards the end of his patrol, André spotted another four Fw 190s flying towards a group of Il-2s on a bombing run. His squad engaged the German fighters, and he again chased one that tried to escape.

It headed south, then west, towards the now-distant German front line. André fired on it five times before it sank to the ground and landed on its belly in a marshy area near Königsberg.

Around 1pm, two squads of six Yaks each were dispatched by Normandie to defend bombers undertaking an all-out assault on the city's already damaged defences. Almost every available Soviet Air Force aircraft capable of carrying bombs was deployed on this attack.

Aspirant Lorillon was among those sent to protect the bombers. While flying cover for Il-2s, Pe-2s, and Douglas Boston IIIs, he looked over and noticed a DC-3 among them. As he stared in amazement, the crew opened the side door and began tossing bombs out by hand.

Peering down, Lorillon found it impossible to see what effect the bombs were having – the entire city was hidden beneath a shroud of smoke and flames.

For the rest of the day, Normandie pilots strafed ground positions and hunted for targets of opportunity. One spotted an E-boat attempting to escape the city's port and make a run for the Baltic. He flew down and attacked, watching his 20mm cannon shells cut into it. He then made a second pass before leaving the wreckage of the vessel sinking into the icy waters.

The end of Königsberg

During the final assault on Königsberg, including the devastating bombing raids, some 40,000 German troops were killed and another 92,000 taken prisoner afterwards. Just 30,000 civilians remained within the city's ruined walls and an uncounted number of slaves.

Three Soviet armies took part in the attack – the 11th, 43rd and 50th Guards Armies, comprising approximately 106,600 soldiers. Of these, around 24,500 were specially trained and equipped assault troops. Soviet casualties were relatively light at 3,700 killed.

Assessing the battle in its aftermath, the Soviets counted 193 tanks or SPGs on the German side, compared to 538 on the Red Army side; 120 aircraft, compared to 2,174; and 3,216 field guns, against 2,567 – plus a further 2,358 heavy artillery pieces.

Normandie-Niemen fought through the war in the east and, in June 1945, was allowed to return to France with a gift of 40 Yak-3s from Stalin himself. These modern fighters form the basis of the fledgling post-war French air force. ■

For more, see:
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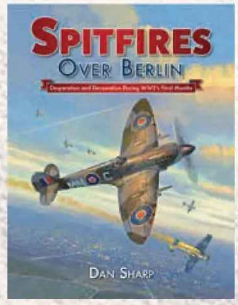

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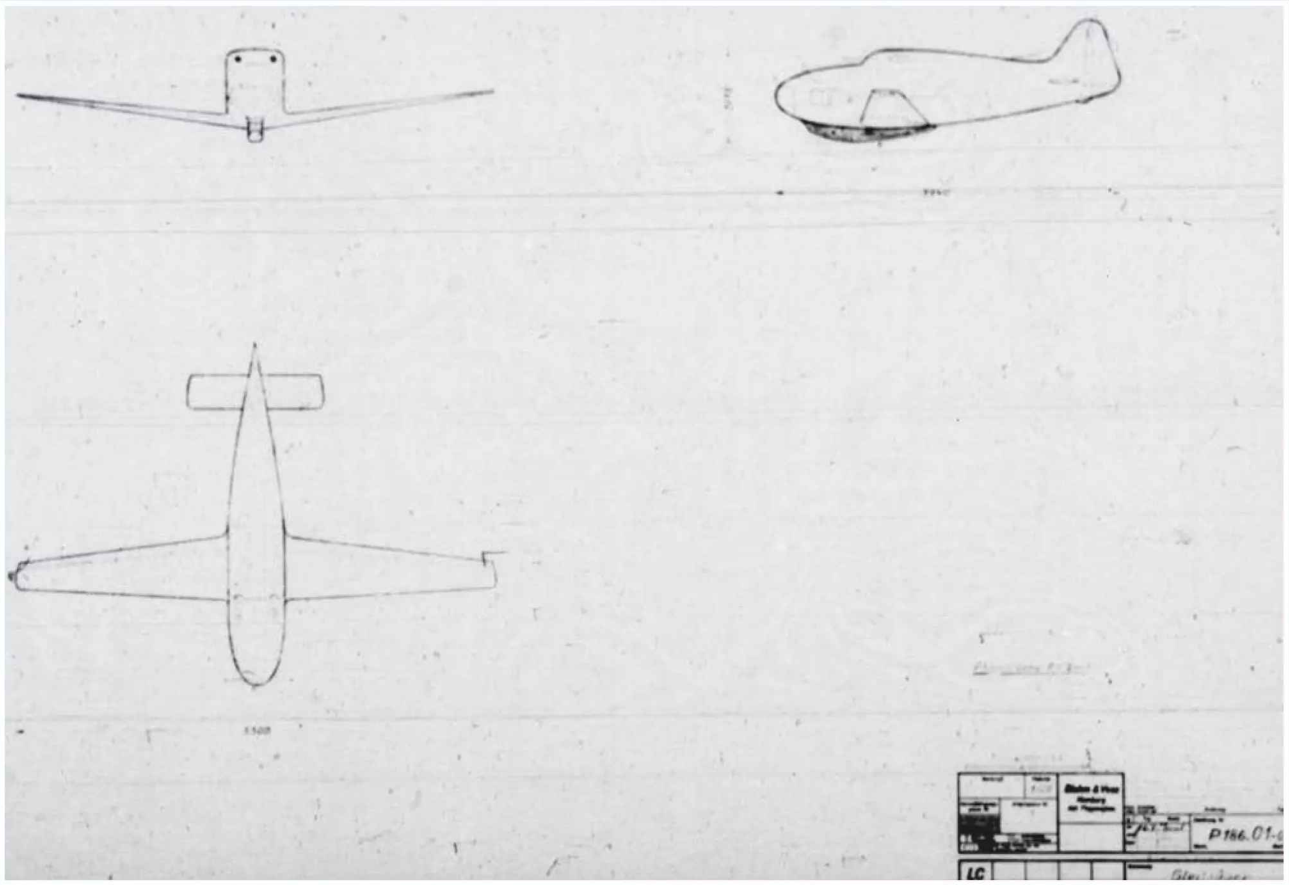


Blohm & Voss's P 186.01-01 'Gleitjäger' design – less than 4m in length and with a wingspan of 5.5m. Two cannon are positioned in a 'hump' above the prone pilot's tiny cockpit and the undercarriage is a thick skid.

Blohm & Voss BV 40

Originally designed to intercept bombers, the BV 40 armoured glider was nearly cancelled before its first flight – only to be saved and repurposed as a weapon for suicide attacks on Allied shipping. Dan Sharp examines the development and operational plan for this highly unusual glider.

Operation Gomorrah involved large formations of heavy bombers from the RAF and USAAF targeting Hamburg, northern Germany, repeatedly over eight days, beginning on July 24, 1943. The night of July 27 was the most destructive, with 353 Avro Lancasters, 244 Handley Page Halifaxes, 116 Short Stirlings, and 74 Vickers Wellingtons deliberately bombing densely populated housing estates in the city centre with high explosive and incendiary bombs.

A combination of warm, dry weather, high-explosive bombs with delayed-action fuses to suppress firefighting efforts, and the sheer concentration of the attack created an unprecedented firestorm – a shrieking tornado of flames – with winds reaching up to 240km/h and temperatures above 800°c.

The death toll for that night is estimated at over 18,000 people, and the total toll for Gomorrah is believed to have been around 37,000. An estimated 800,000 people were left homeless.

Afterwards, Germany was stunned and horrified. The Luftwaffe had proven completely ineffective in preventing the attacks on Hamburg, despite their repetitive and thus predictable nature.

While the most devastating attacks had hit civilian housing, the aircraft design and manufacturing facilities of Blohm & Voss, situated on the eastern side of Hamburg on an island in the River Elbe, had also been targeted – though unsuccessfully.

In the immediate aftermath of Operation Gomorrah, Bohm & Voss's creative chief designer Richard Vogt and his team developed a concept for a new aircraft, designated P 186, which was specifically intended to target and destroy enemy bombers.

It was to be a small, heavily armoured, glider that would be towed aloft by a conventional fighter aircraft before being released to swoop down on the bomber formation with the goal of ramming their fragile tail fins, inflicting enough damage to knock them out of the sky.

Meanwhile, just over three months earlier on April 17, 1943, a new unit had been established specifically to develop and test experimental weapons and equipment for bringing down the Allies' heavy bombers – Erprobungskommando 25 (E.Kdo 25).

It is unclear exactly when Vogt presented the P 186 concept to the German Air Ministry, but it apparently received a favourable response and drew the attention of E.Kdo 25. That unit's Major Hans-Günther von Kornatzki apparently wrote to Galland around this time with a proposal "to have enemy four-engined bombers rammed by volunteers, [who have been] little used in this war and due to age, suitability and agility [and who] even in the future [are] hardly to be used as full-fledged fighter pilots". Kornatzki believed that "enough old fighter pilots have volunteered to set up a strong squadron. Young aviators, who are based in the west of the empire and who have lost property and, in some cases, relatives due to bombing, also came forward. The aim of ramming the enemy aircraft is to decisively impact the morale of the enemy pilot crews and to weaken the enemy organisation sustainably, making it much easier for the fighters immediately following".

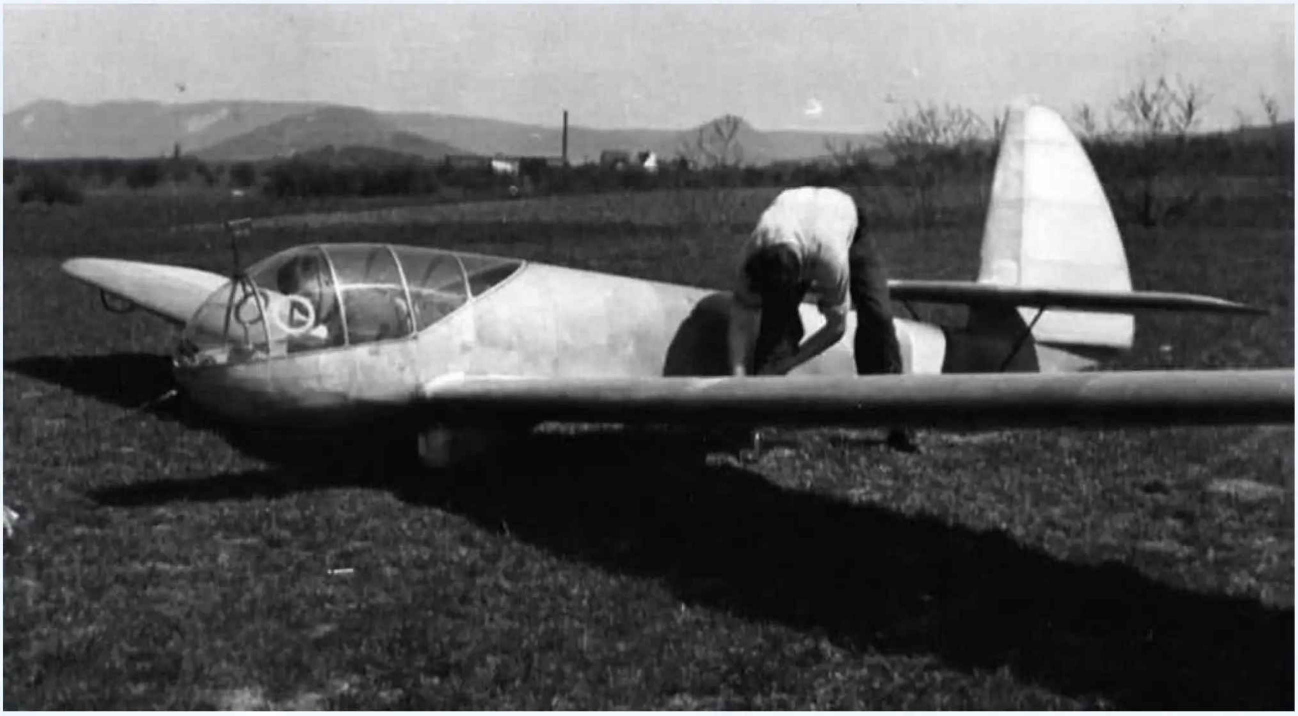
The P 186 had already been presented and discussed by August 19, 1943, when the ministry wrote a letter to Vogt headed 'Regarding: Glide-fighter'. It said: "You are asked to continue to work seriously on the proposal you have submitted for the 'Glide-fighter' [Gleitjäger] and to comment immediately on the possibilities of the design work you will carry out."

Going prone

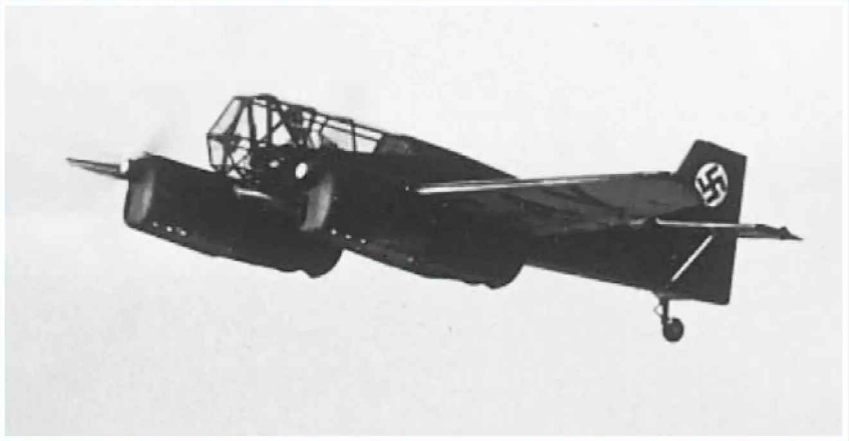
More than five years earlier, on March 21, 1938, an unusual glider, constructed by students of Akademische Fliegergruppe (Akaflieg) Stuttgart made its first flight at Teck airfield near Dettingen/Teck. Known as the fs17, its most novel feature was the position of its pilot – lying almost prone, head forward, on a specially constructed couch within the nose of the vehicle.

Work on building the glider had begun in 1937, based on the theory that a pilot lying down would be able to withstand higher g-forces than one sitting down.

The concept was then revived in 1942 by the Deutsche Versuchsanstalt für Luftfahrt (DVL), who commissioned the Flugtechnische Fachgruppe Berlin (FFG-Berlin, aka Akaflieg Berlin) to start work on a powered aircraft which would allow further testing of the prone pilot position. The result was the B 9, a tiny machine with a fuselage made from steel tubes and wooden formers covered in fabric. The trapezoidal fuselage cross-section had a maximum area of just 0.67 square metres, tapering down to a ➤



The Akaflieg fs17 glider. This experimental vehicle, constructed in 1937, pioneered the concept of a prone position cockpit – which allowed the pilot to withstand greater g-forces.



B 9 in flight.

fin at the tail end. The pilot lay in the nose beneath a jettisonable 1.5m-long canopy.

The B 9 weighed 1,115kg fully loaded, had a wingspan of 9.4 metres, a wing area of 11.9 square metres, and was 6.09 metres long. The introduction to a DVL report on the B 9, dated May 1944, outlined the reasons for continuing work on the prone pilot configuration: "It is customary for the pilot of an aircraft to have a seated position, taken over from vehicles designed for two-dimensional movement on the ground. This provides him with a comfortable position with which he is familiar, suitable for long-duration piloting and in which he possesses the freedom of movement necessary for flying the aircraft.

"[However,] the conditions originating from movement in space – flying – and the increased physical demands on the human being necessitate the investigation of other positions for the pilot: 1. Prone, prostrate, or kneeling, 2. Lying on the back, 3. In a backwards-tilting seat. Lying on the back is, despite being suitable for high accelerations, impracticable on account of poor forward and downward vision and the general feeling of helplessness in this position.

"The backward-tilting seat would combine the advantages of the normal seated position (good view) with those of lying back (for high accelerations). It requires much space, additional mechanism and causes considerable difficulties in shifting the controls and switches. The weight, bulk, and complications are not justified compared with the prone position.

"The tradition of flying aircraft from a seated position counts against the prone position. This is particularly emphasised since it is undesirable to shift the position of the horizon from its customary place in the field of view. A judgement on the advantages and disadvantages of the new arrangement and on the resulting difficulties can only be given after flight investigations."

In other words, a prone pilot could safely perform extreme manoeuvres that might render a seated pilot unconscious.

On the couch

A key aspect of the B 9's testing regime was establishing the fundamentals of prone pilot cockpit design. The report stated: "The pilot is best placed in the fuselage. The cross-section is narrowed near the head to reduce the cross-sectional area and improve the pilot's view. Controls and switches can be situated in long instrument banks at armrest level.

"The couch must provide a comfortable position for all pilots of service height (1.65 metres to 1.90 metres) in which the flying time required for tactical reasons can be endured by the pilot on fighter or ground support duty without inconvenience."

Fitting a parachute into the prone-pilot cockpit proved to be a significant challenge initially. According to the report: "At the time of the construction of the mock-up for the B 9, existing German parachutes did not comply with the requirements of a prone position."

Prone controls

Designing the B 9's controls presented the DVL with a dilemma. It would be very difficult for the pilot to reach controls on the left side with his right hand and vice-versa, since he was effectively resting on his elbows throughout the flight. As such, the controls were strictly separated into right and left-hand side sections.

The "right hand is fixed for aileron and elevator control, and the left for all secondary controls and switches. Rudder control and brake application are, as in the seated position, by the feet. The right hand additionally operates emergency handles for harness release and hood jettisoning. In accordance with the purpose – single-pilot fighter or ground-support aircraft – the left hand will, particularly at the moment of highest concentration (in the attack), stay at the throttle, and only the right hand will be free for the primary controls."

Blohm & Voss and the B 9

First to fly the B 9 was test pilot Hauptingenieur Hans-Werner Lerche at Rechlin on April 10, 1943, followed by one of the aircraft's designers, Leo Schmidt, on April 14. Several DVL engineers clambered into the small machine's cramped cockpit and flew it throughout June and July. Then, on July 30, Focke-Wulf Betriebsführer Kurt Tank flew the B 9, followed the next day by two of his test pilots – Werner Bartsch and Kurt Mehlhorn. Heinz Scheidhauer, test pilot for the Horten brothers' Sonderkommando Horten, flew it on August 29.

Back in Hamburg, Vogt wrote a memo on September 8, 1943, saying, "I found out from Mr Schmidt, Akaflieg Berlin, that Mr Malz wants to fly the machine with another pilot tomorrow. Schmidt wants to come to Wenzendorf at the beginning of next week. Check with Malz and Czolbe that this deadline will be met and that we will have the aircraft for at least one to two weeks."

Vogt was clearly trying to book the B 9 so his engineers and test pilots could spend time examining its layout and systems – Wenzendorf being the Blohm & Voss factory airfield. The P 186 glide-fighter/rammer was designed with a prone pilot position from the start, so having access to the B 9 for a week or more would be vital for gaining practical experience with the configuration.

Shooting, not ramming

Vogt wrote to the Air Ministry's Technical Office on October 30, 1943, to say that "following our suggestion to use a glider towed by the normal fighter as an offensive weapon against enemy bomber formations, we have made some calculations".

It had been worked out that attacking an enemy bomber formation from behind was unlikely to be a viable option, since it would require the fighter/glider combination to be extremely high above the formation. Adding a rocket motor to the glider would reduce the attack altitude but also add weight.

Therefore, "on the occasion of a visit from your men Malz and Czolbe, the attack from the front was discussed and judged to be the only promising procedure. Of course, it made sense to consider ramming the tail fin of the enemy machines in addition to firing [at them] from very close range.

"In view of the psychological difficulties [of a ramming attack] and the need to put considerable weight into [providing] ram-proof wings, we would like to propose … refraining from intentional ramming for the time being and sticking to close range shooting attacks as the task".

A document on P 186 design load assumptions produced on November 29, 1943, stated that "The type is used as a pure glider without propulsion. Using the Me 109 G as a tow plane results in a maximum initial altitude of 11km. The modification of the fighter [the P 186] as a ramming aircraft is not being investigated for the time being. Armament: one Mk 108 cannon. Skids for landing and a jettisonable wheelset for take-off."

Prototype order

Vogt attended a meeting on December 8, along with Rodig and Hamel from Blohm & Voss's flight test division, to discuss an order for 12 P 186 prototypes with Galland's representative Hauptingenieur Knorr, along with Heinrich Beauvais and Julius Klein from the Rechlin test centre.

The Luftwaffe apparently also considered "it very important that the wing can be assembled extremely quickly with just a few movements" and "since it is planned to be towed behind the single-engine fighter for reasons of performance, the chassis has to be modified. To get the aircraft through the propeller wash as quickly as possible during take-off, it must first be held on the ground. This is only possible if the main landing gear is close to the centre of gravity".

Schlinge was essentially a cable-towed aerial bomb, the development of which began at the Rechlin test centre around the same time as the original P 186 proposal was submitted in August.

After some experimentation, by November 1943 Schlinge consisted of a cylindrical metal container housing a cable of between 100 metres and 400 metres in length. This could be attached to any aircraft via an ETC 50 bomb rack. The 10kg bomb itself was positioned outside the container as a weight on the end of the cable.

The P 186/BV 40 was designed with its weapons mounted on top of the fuselage— firing over the pilot's position— but "in another meeting on December 15, 1943, the previous weapon installation was fundamentally changed." It was feared that recoil from the cannon in this 'top-heavy' position would cause inaccuracy, so "to be on the safe side here, it was decided to arrange the weapons on the right and left of the fuselage directly under the wing."

A memo dated December 15 confirmed the BV 40 designation. It noted that the project had been assigned the 'SS' level of priority for resource allocation, but an application had been submitted for 'DE' priority – the highest level.

Production begins

Work on preparing the BV 40 prototype's workshop drawings began immediately. A production meeting held at Blohm & Voss on December 17 noted that "the project work is completed", but "the planned 'ready to fly' date at the end of February seems to be very short under the given conditions".

A memo dated Christmas Eve 1943 stated that Blohm & Voss had been attempting to order the necessary wood for the BV 40 prototypes from a company called Wächter at Neustadt, but had been told that without a DE priority level, the earliest date that the wood could be

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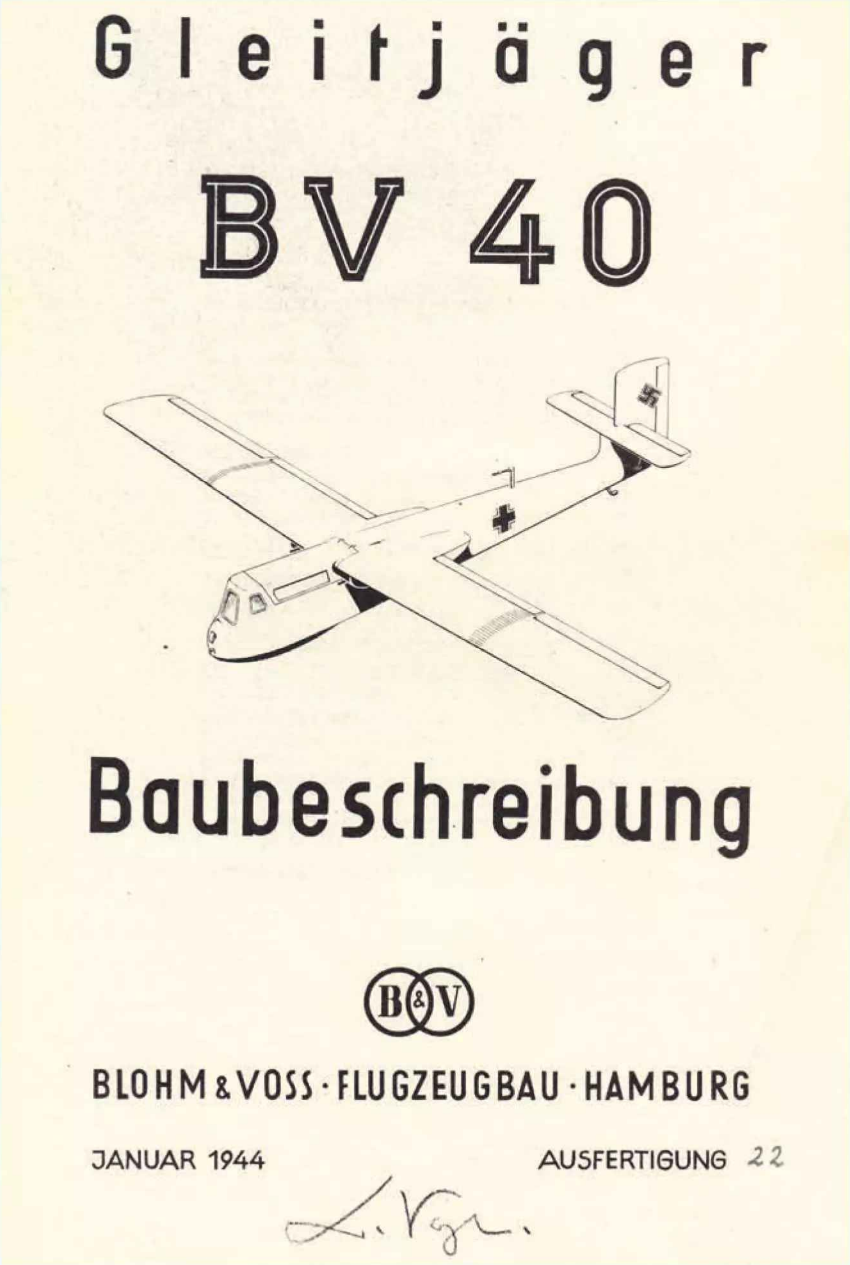


Gleitjäger

BV 40

Baubeschreibung

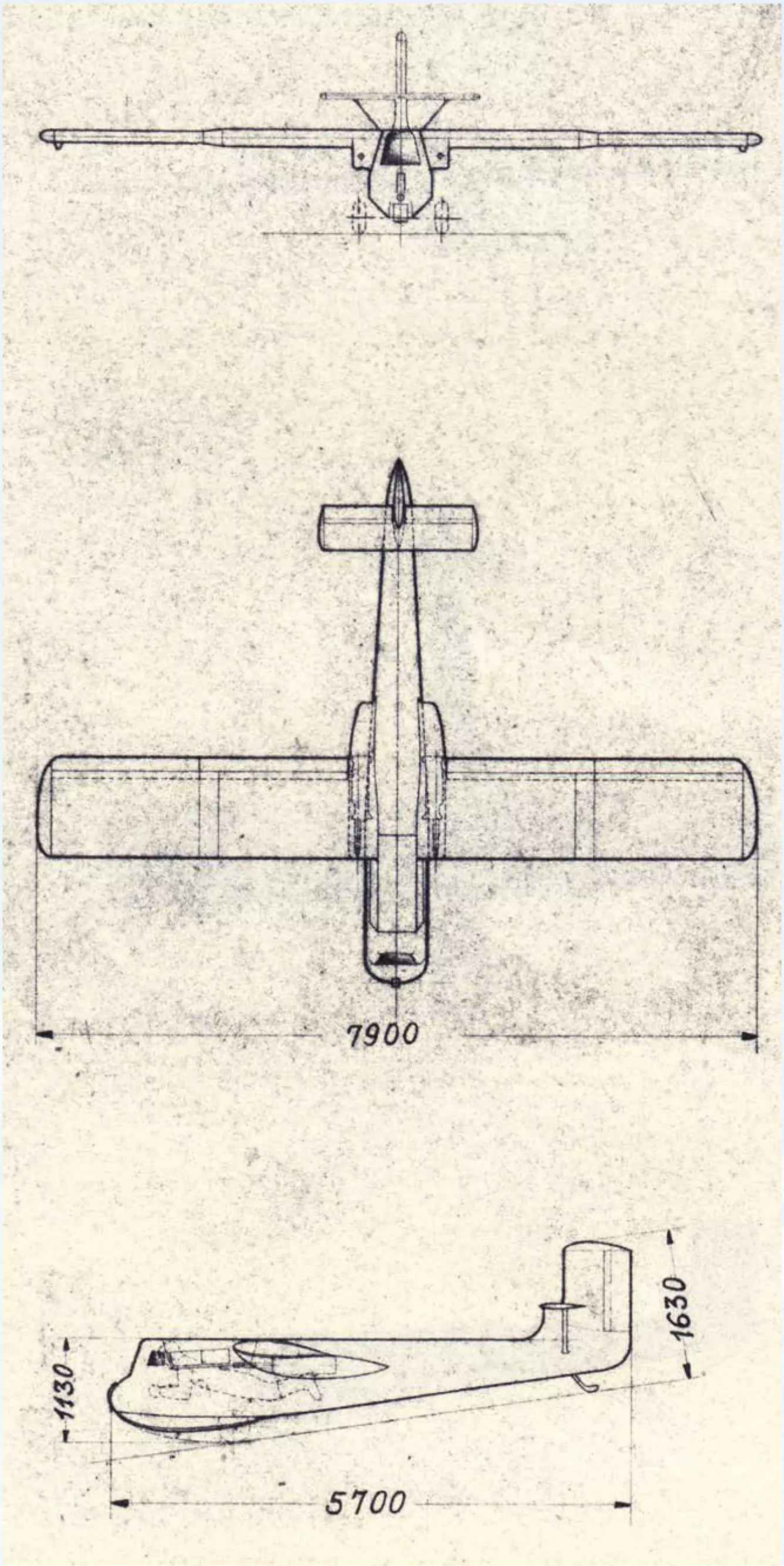
B&V

BLOHM & VOSS · FLUGZEUGBAU · HAMBURG

JANUAR 1944

AUSFERTIGUNG 22

The cover of Blohm & Voss's January 1944 description of the BV 40 Gleitjäger.



This illustration from the type sheet within the January 1944 description shows the BV 40's final layout as a 'glide-fighter', with twin MK 108 cannon in wing root nacelles.

made available for collection by courier was January 15.

Blohm & Voss statics department representative Fahlbusch wrote a memo on December 27, stating that Wächter were continuing to refuse the supply of beech plywood.

Attempts to have the BV 40 regraded to the DE priority level had gone nowhere since then. It was reported on December 28 that Czolbe, at the Air Ministry, had gone on holiday and would not be back until January 3.

Vogt also attempted, again, to get DE priority for the glider: "Since the purchase of building materials is causing difficulties in view of the tightness of the desired construction deadline, we have submitted a DE application. Asking Adolf Galland's office for support in this regard.

A fourth letter of December 30 was fired off to both the Kronprinz company – seemingly the go-to undercarriage manufacturer of the Third Reich – with a copy going to another firm, Fluggeräte Elma of Stuttgart-Bad Cannstatt. The Kronprinz version said: "For our new BV 40 model, a small glider with a take-off weight of approx. 900kg, we need a spring strut according to the attached drawing ALSK 314. The spring strut is used to cushion a skid.

"The BV 40 should be ready to fly by the end of February. We are aware that you will not be able to develop a new spring strut for us before this date, but perhaps it would be possible for you to take a spring strut with similar dimensions from an existing stocks."

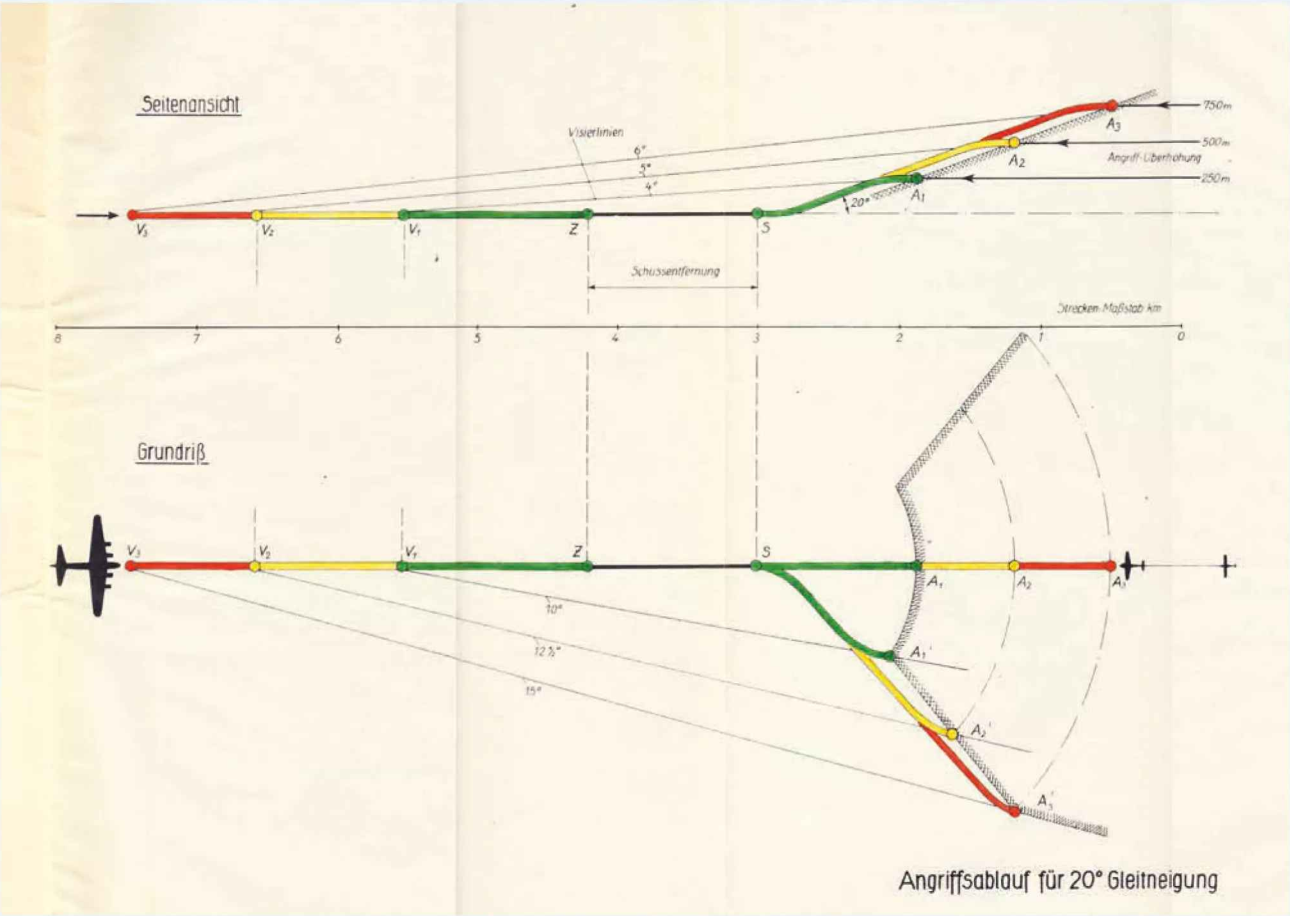
Shipbuilding steel

A meeting was held at Blohm & Voss on January 3, 1944, to discuss measures now being taken to circumvent the usual supply chain.

It was noted that "an attempt is being made to procure suitable plywood from the shipyard for the frame production of the first and second machines". Blohm & Voss Flugzeugbau was a division of the much larger Blohm & Voss shipbuilding company.

And "if the armour steel, which is procured from the construction office, is not available at the time, four pieces [airframes] can be made of shipbuilding steel."

The second BV 40 production meeting was held on January 6, 1944, and, as it was the depths of winter, it was emphasised that, where woodworking was concerned, "maintaining the correct temperature levels is very important." ➤


Seitenansicht
Visierlinien
6°
5°
4°
750m
500m
Angriff-Überhöhung
250m
A_3
A_2
A_1
20°
V_3
V_2
V_1
Z
S
Schussentfernung
Strecken-Maßstab km
8
7
6
5
4
3
2
1
0
Grundriß
V_3
V_2
V_1
Z
S
A_1
A_2
A_3
10°
12½°
15°
A_1'
A_2'
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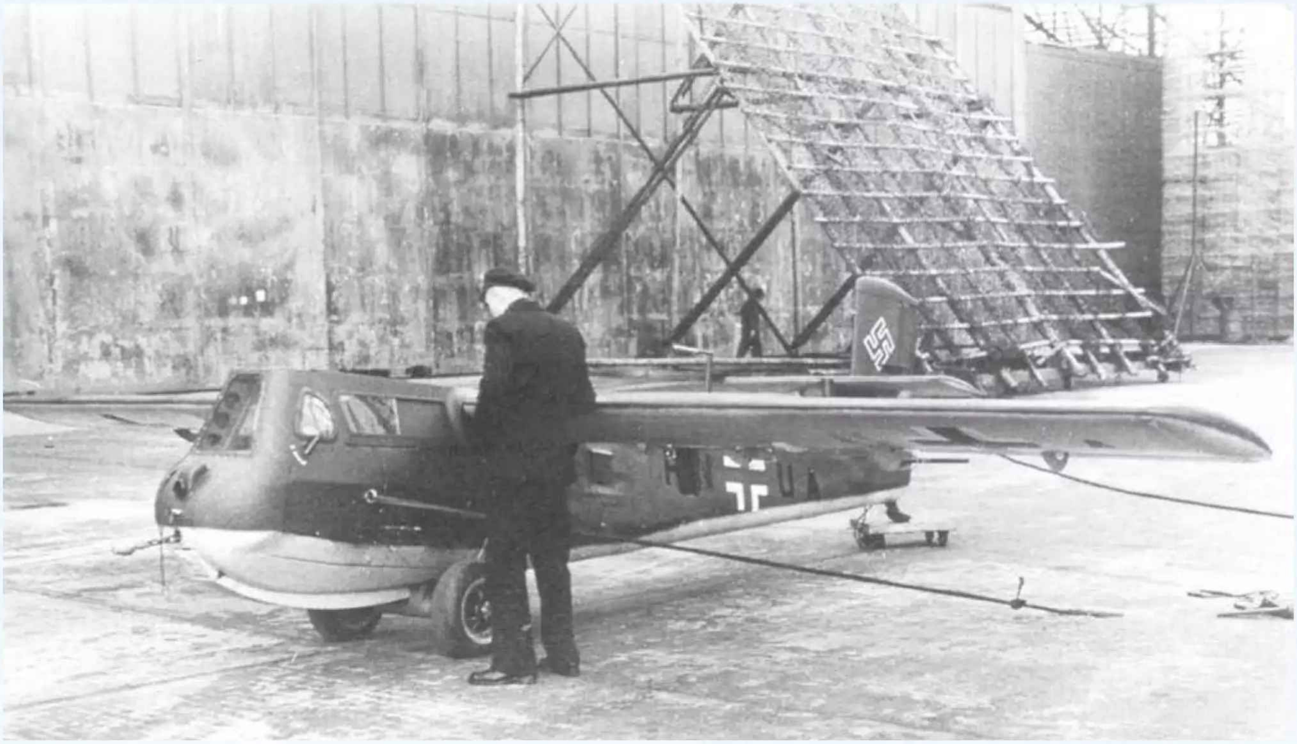
Angriffsablauf für 20° Gleitneigung

Diagram illustrating the BV 40 head-on attack sequence from various elevations and angles.



The first BV 40 prototype looks somewhat unfinished without its underwing nacelles. A hatch panel is absent from its side, and it appears that the windscreen has not yet been fitted or has been removed.

The necessary laminated wood and plywood were still missing and "can be brought in by January 20 at the earliest, and even then, only if there is a DE order. The armour plates can only be delivered six weeks after ordering; the necessary drawings will not be available before the end of January."

BV 40 advantages

The first comprehensive description of the BV 40 was completed by January 7, 1944. The introduction outlined what Blohm & Voss regarded as the BV 40's greatest advantage – its small frontal cross-section, which made it very challenging to hit when faced head-on.

"The shorter the combat distance, the more the accuracy of the enemy's defensive fire increases, so this path [shooting at an enemy bomber from close range] can only be taken if the chances of being hit by the enemy's projectiles are reduced.

"By putting the pilot in a horizontal position, the endangered frontal area can be reduced to about 0.5 square metres, which is only a third of that of a fighter with an air-cooled engine, so that in the context of the above comparison, the 1,000 metres starting distance only corresponds to about 580 metres.

"If you now combine that with strong frontal armour, in terms of reducing the hit effect [of the enemy's weapons] – and that is possible with such small cross-sectional dimensions without great sacrifices in weight – then you have created an extraordinarily effective weapon for the very close combat distance".

Nevertheless, "in terms of value, the glider represents a minimum of effort: without engine, propeller or landing gear and without large equipment, with about a third of the wing and fuselage dimensions, and built with the cheapest material, primitively without reducing operational effectiveness, its use is justified even if the possible uses are limited."

The report stated that the BV 40 operational flight had two phases: tow and attack. It was only worthwhile beginning the operation, it was noted, if sufficient advance warning could be given. Assuming this condition was fulfilled, the fighter and its towed BV 40 would take-off and climb to an altitude of 8.5km, with both fighter and glider travelling at 475km/h. For the glider pilot, determining the proper point of release would be a case of correctly lining up a 'notch' on the bulletproof glass visor.

For the towing phase, it was pointed out that the performance of the towing fighter would be unavoidably hampered before release, but "it is even possible to tow two gliders at the same time with a normal fighter and thus still reach considerable altitudes".

A head-on attack meant the glider pilot would only have a brief window of opportunity to open fire.

BV 40 disadvantages

These reports pull few punches when it comes to outlining the disadvantages of the BV 40. Take-off would be "the most difficult part of the operation in terms of flying".

This was because "the strong concentration of power in the propeller is expressed in a very pronounced twist of the turbulent air behind the fighter, especially immediately after take-off and during climb.

"The simplest procedure would be to start with a very long tow line. It would have the disadvantage that, in bad weather, e.g., when climbing through high layers of cloud, the line of sight to the towing vehicle would be lost."

Once in the air, "the prone position of the pilot naturally impedes his ability to operate the rudders. This can only be compensated for by the fact that all rudders, despite small control paths, are designed for small but steadily increasing operating forces." So, keeping the BV 40 entirely under control was likely to be a challenge."

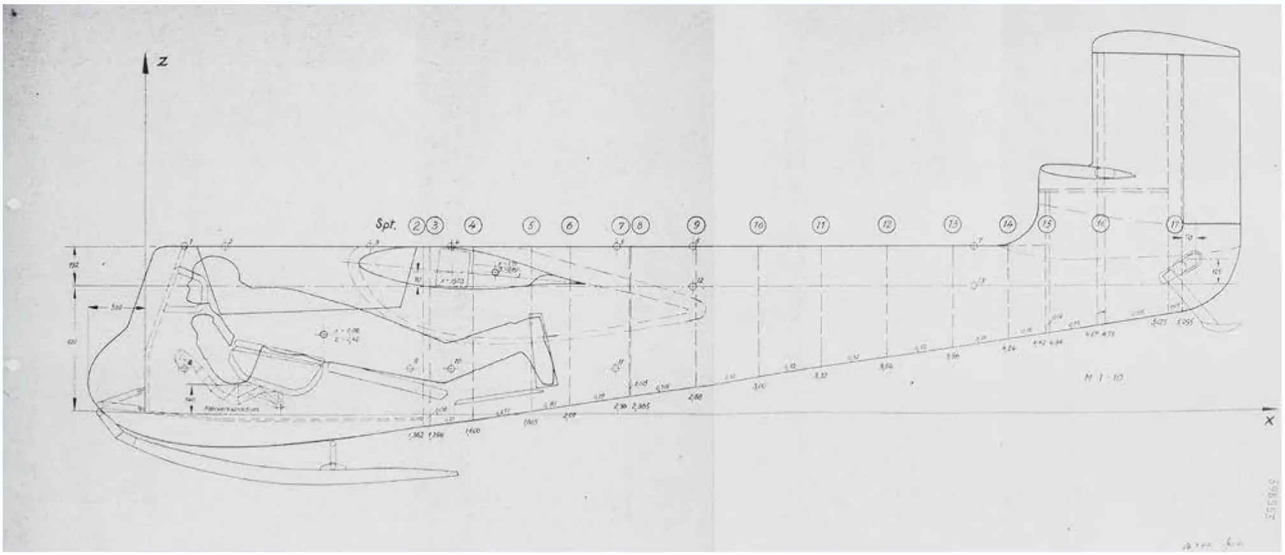
According to the report: "Since transport in an unassembled state is not possible, given the existing dimensions, attention will be paid to easy dismantling during construction.

"The fuselage without wings weighs about 580kg. The simplest method of transport is to use the original starter gear [by refitting the axle tube and two BV 141 tailwheels].

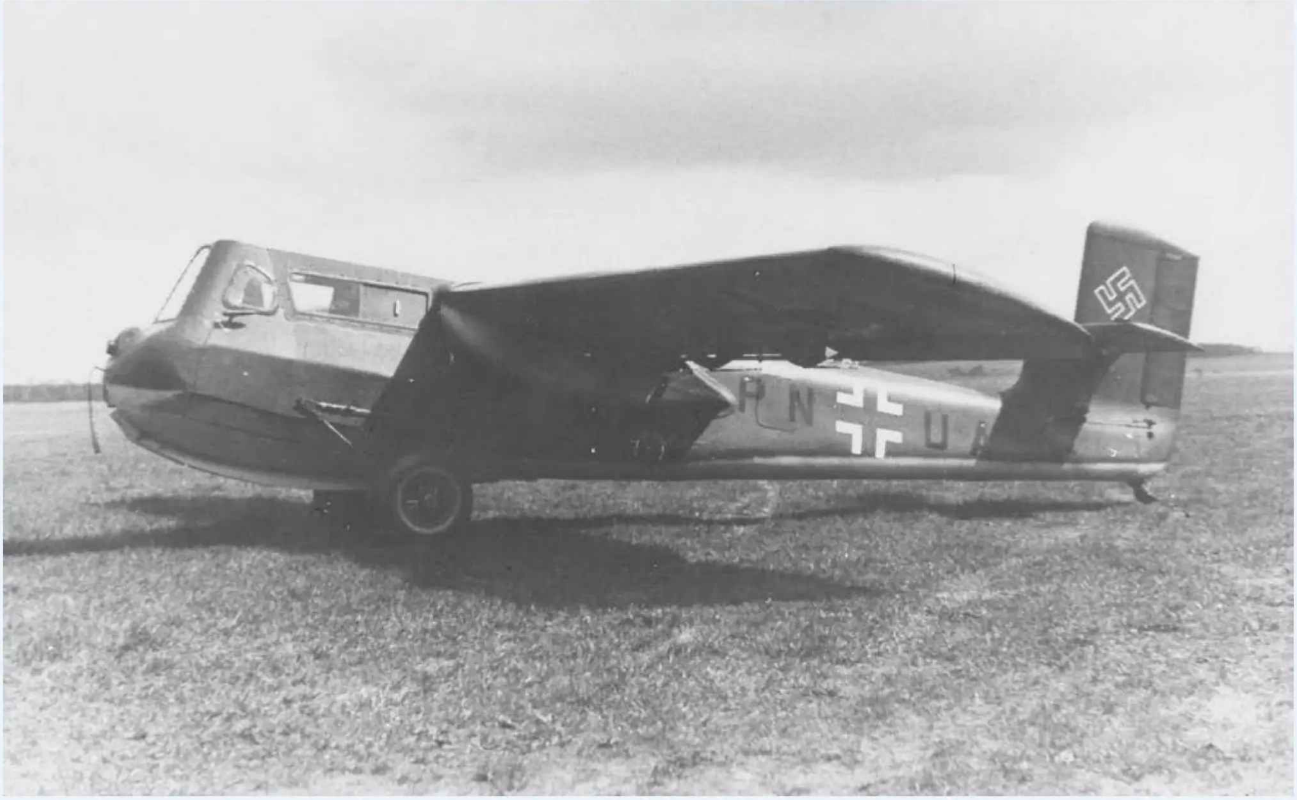
"You can activate the quick-release point of the cockpit and then transport the armoured section, which weighs about 300kg, on its own. Two suitable through-openings are provided above the skid for this purpose."

Suicide attacker

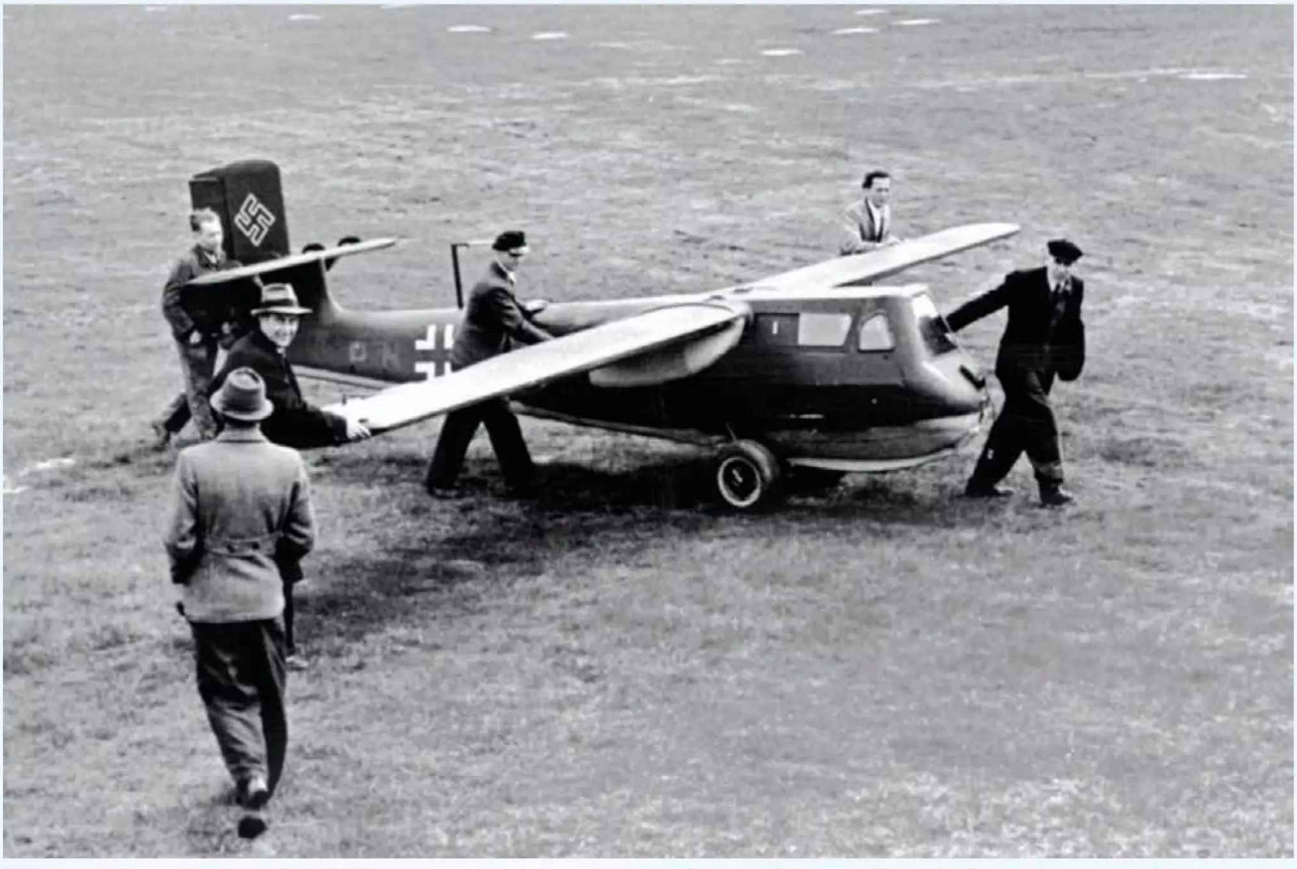
The Air Ministry arranged, on March 2, for a Messerschmitt Bf 110 G-0, WNr. 5188, to be transferred to Blohm & Voss specifically for towing BV 40 prototypes. ➤



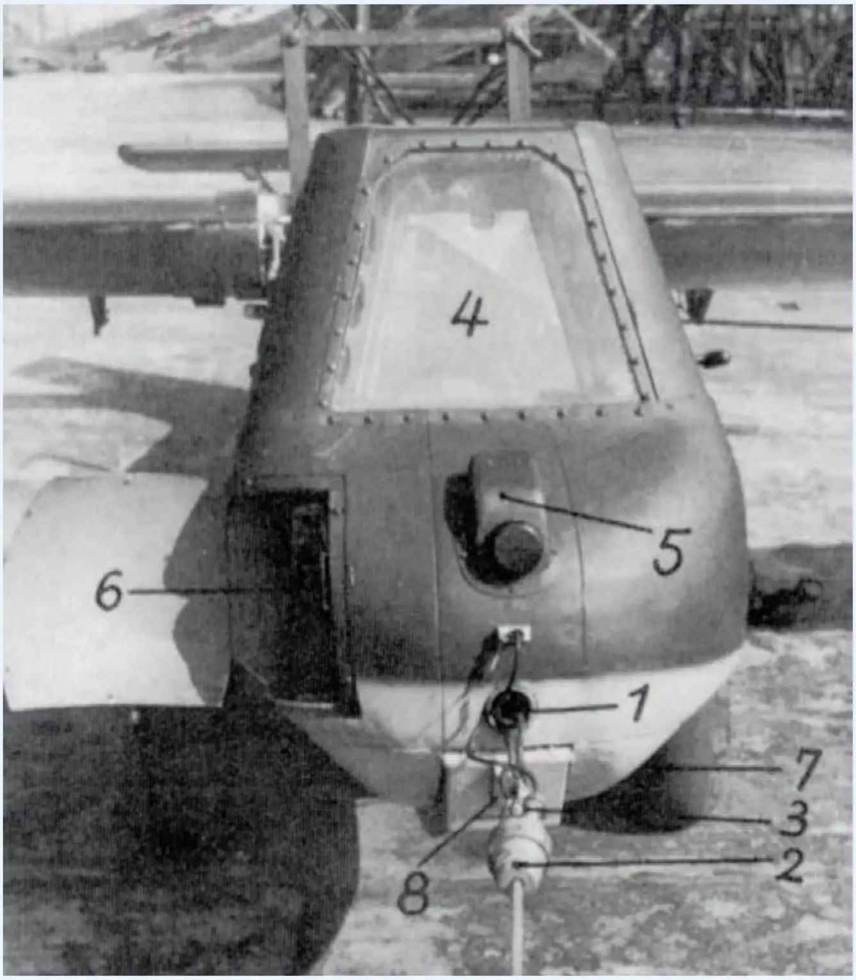
Side view showing the BV 40's straightforward internal layout as well as the two 20mm armour plates between the pilot and the aerodynamic nose fairing. The drawing is dated March 16, 1944, the same day that consideration of a "new tactical situation" for the glider began.



Another view of the BV 40 V1. It appears at the port side of the aerodynamic fairing on the front of the aircraft is sporting a dent from some mishap, perhaps when attempting to land or during an aborted take-off.



A demonstration of how easy the BV 40 was to manoeuvre on the ground – a small team could handle it.



Close-up. Point 5 is the compass housing which had to be attached externally to keep it away from the steel armour plates. The pilot viewed it using mirrors inside the aircraft. Point 4 is a regular windscreen, since the planned bulletproof glass wasn't installed on the V1 prototype.

Meanwhile, Vogt had been exploring the possibility of fitting the BV 40 with the liquid-fuelled HWK 109-507 rocket motor from an Hs 293 anti-shipping missile.

He noted in a memo dated March 16, which he passed to Bürkner for the attention of Malz, that "with a deployment path of 15-30km after the [glider's] release, a new tactical situation has arisen that needs to be considered seriously".

Without the backing of Galland's office the BV 40 might have been cancelled immediately had it not been for the interest of the unnamed 'other department'. And this 'department' appears to have been none other than the Luftwaffe's special operations unit Kampfgeschwader 200 (KG 200). Fliegerstabsingenieur Hans Christian Tilenius, KG 200's technical officer, was now liaising with Blohm & Voss on preparing the BV 40 for a new mission. Tilenius attended a conference on precisely this mission on April 17 with former glider pilot Oberleutnant Karl-Heinz Lange of I. Luftlandegeschwader (Glider Assault Wing), which, in late 1943, had put forward the view that, to quote author Robert Forsyth, "a small unit of ideologically radicalised pilots could inflict great damage against an anticipated Allied invasion fleet by flying Totaleinsatz ('total commitment' operations) in manned glide bombs. Put another way, these would be Selbstopfer (self-sacrifice) missions. Lange put his idea forward to the Lange as a serious proposal.

However, in early 1944, no such manned glide bomb existed to carry out the task."

From this point on, the BV 40 was effectively repurposed as a manned glide-bomb. Blohm & Voss's initial response on how to modify the design to suit this new mission was to remove the two underwing MK 108s and replace them with attachment points for two BT700 anti-shipping torpedoes. So armed, a pair of BV 40s would be carried aloft beneath the wings of an He 177 bomber.

First test flight

The results of flutter tests on the BV 40 V1 prototype were published on April 27, and it was concluded that there were no concerns in this area.

Vogt sent a memo to Bürkner on May 2, 1944, asking him to "contact the DVL's flight mechanics management [department] immediately and ask Mr Schmidt to bring the prone position aircraft [B 9] to Wenzendorf in the next few days. After an unsuccessful take-off with the BV 40, Mr Rautenhaus wishes to fly the said aircraft again immediately before the next take-off".

Clearly, Blohm & Voss test pilot Rautenhaus had attempted a take-off in BV 40 V1 but had failed to become airborne – presumably sometime between April 27 and May 2. Why this take-off failed and whether he did indeed get to fly the B 9 again before his next try at a prone position glider take-off is unclear.

However, the glider apparently suffered no damage in the attempt and Rautenhaus was ready to go again on May 6. Vogt sent a brief telex to the head of the Air Ministry's Technical Office in Berlin shortly afterwards to "share the successful first towed flight with the BV 40. Landing at the edge of the field over the fence caused minor wing damage."

Blohm & Voss received a memo from the Technical Office on May 10 stating that "Henschel equipment", presumably the rocket motor from the Hs 293, was not to be procured for the BV 40 – confirming that a rocket-boosted variant was off the table.

Test flights continue

Rautenhaus climbed back aboard the BV 40 V1 on June 2, 1944, for its second test flight. This time, the landing gear wheelbase had been increased, and the tyre pressure decreased. Rautenhaus noted: "The start process was much more pleasant in the first stage, i.e., the shocks were considerably softer. The BV 40 wobbled back and forth after take-off but could be corrected more quickly when the rudder."

The flight was "flawless". The report said: "The towing was very pleasant due to the greater elevation of the BV 40 than usual. The release was made at a speed of 240km/h at 800 metres altitude; the speed with and without flaps was reduced to 150km/h on an experimental basis, and everything went smoothly."

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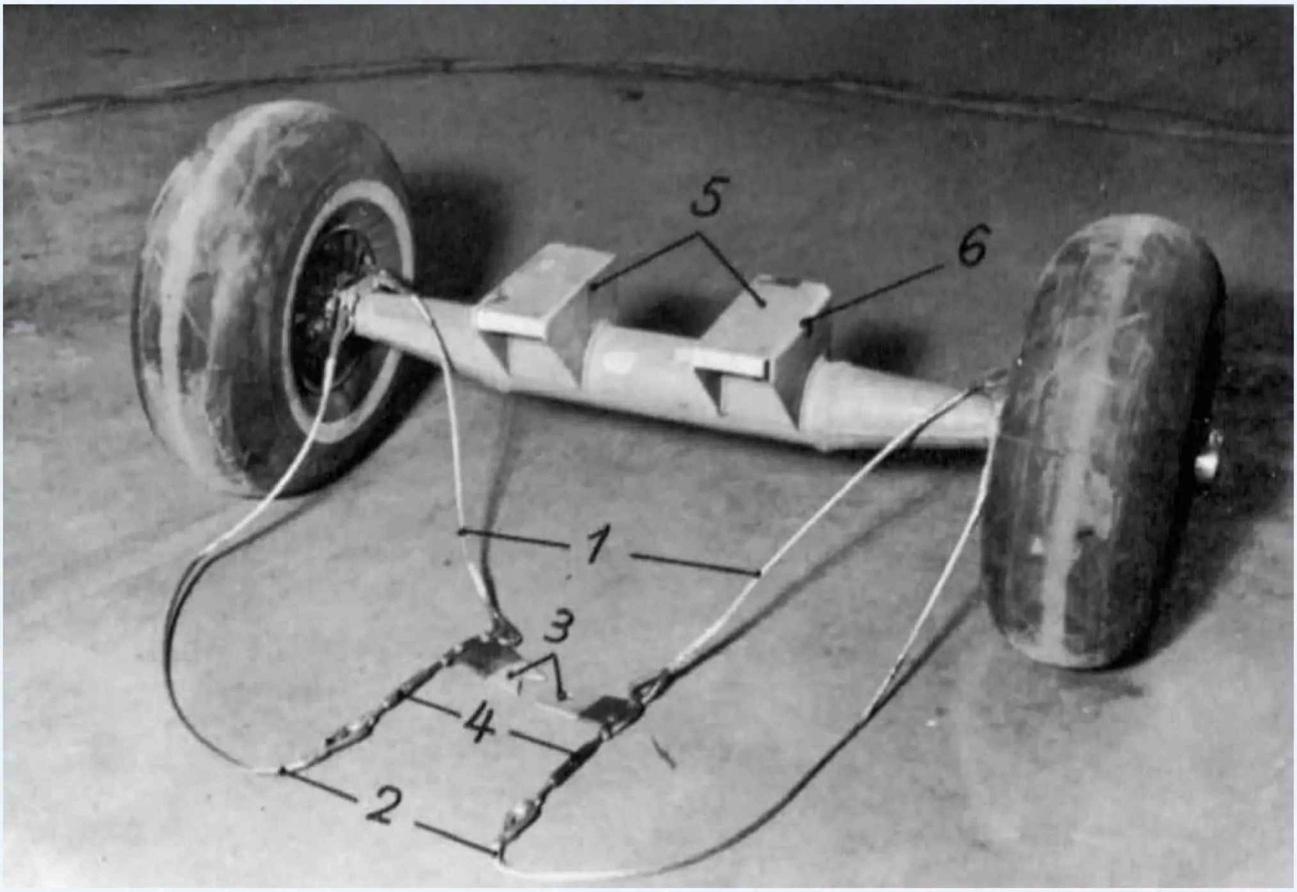
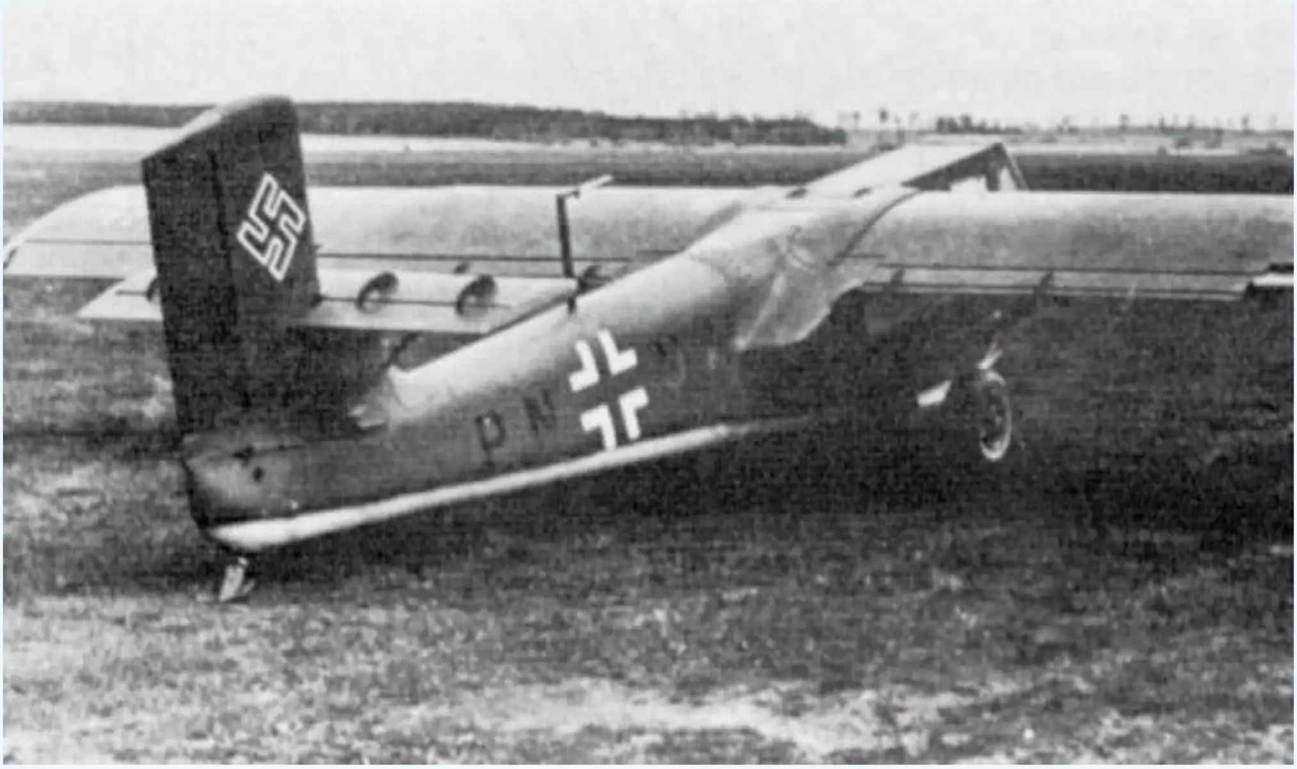
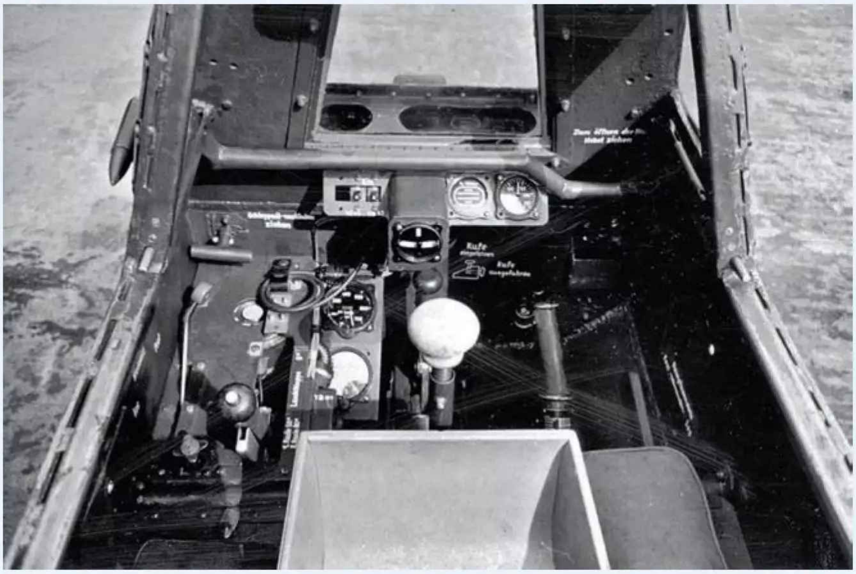


Consisting of two BV 141 tailwheels, the BV 40's wheelset was jettisoned shortly after take-off at an altitude of 5-10m. The pilot simply pulled a lever releasing the cables holding it in place.



The first BV 40 prototype as viewed from the rear.



The interior of the BV 40 cockpit. In the foreground is the tray for the pilot's chest parachute and in front of that is the rounded white chin rest. To the right is an arm-rest cushion.

Everything went wrong during the landing, however. Rautenhaus wrote: "The landing was due to occur at 150km/h, curving close to the edge of the field. This gave the impression of having sufficient flight reserves [at 150km/h, the aircraft still seemed to be flying well], so that there was not the slightest doubt that the landing would go well. At a speed of 140km/h, however, the rate of descent increased very suddenly, so that the machine touched down about 20-30 metres before the edge of the field and broke through the [perimeter] fence, which damaged the fuselage."

By now, the BV 40 V2 was ready to make its first two flights – both piloted by Rautenhaus at Wenzendorf on June 5, 1944.

"During the first flight, the landing gear cable tore, caused by the sharp edges of the patented process used instead of a splice. After repairs were completed, the same damage to the cable was already evident on the second flight. The landing speed was 125 km/h, with the skid absorbing the landing momentum effectively."

Three days later, on June 8, the BV 40 V2 was back in the air again for its third and fourth test flights – the fifth and sixth BV 40 test flights overall. On both occasions, the take-off proceeded without incident."

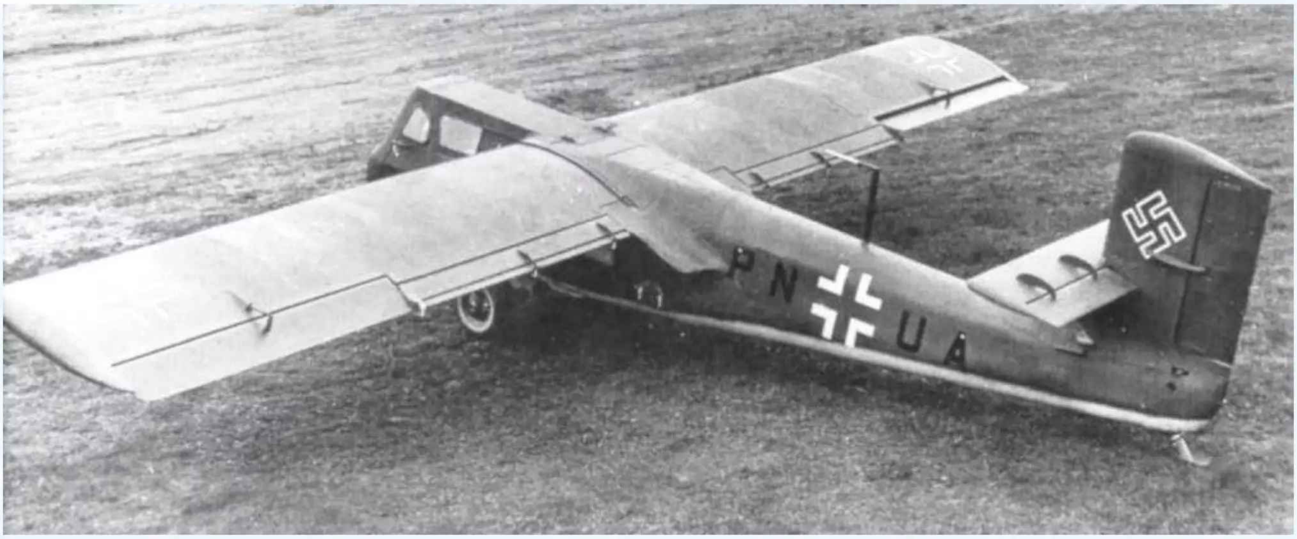
He 177 carrier aircraft

While the flight tests continued, Blohm & Voss sent a representative named Wegner from their 'Special Tasks' department to Heinkel's Zwölfaxing facility near Vienna, Austria. Wegner's mission was to liaise with Heinkel's engineers and arrange the details of how BV 40s could be attached underneath the wings of the He 177. Both the twin-prop He 177 A-5 and the yet-to-be-built He 177 B-5 with four separate engines had been identified as suitable carriers.

In his 'Report on the installation of the BV 40 under He 177 B-5', dated June 28, 1944, Wegner wrote: "In terms of weight, the BV 40 [the report refers to the aircraft by a code name – B 4] can be accommodated under the wings of the He 177, even if it is hung further outwards than indicated in the sketch. However, the statics department of the Heinkel company has concerns about the drag that may occur, because such forces apparently cause the wing to twist, which it cannot absorb.

"The greatest difficulty, however, is to get the BV 40 free from the ground with the bomb attached. The ETC [bomb rack – to which the BV 40 would presumably have been attached] is fitted beneath the outer engine [of the He 177 B-5, with four separate engines] and for this reason had to be built far out on the wing, since we only have 500mm of ground clearance with the maximum load of 1.2 tons under the BV 40 without a bomb. We will have it a bit easier with the He 177 A-5, since this machine has only two propellers and the ETC is correspondingly higher."

A status update on the BV 40 flight test programme's progress to date was prepared at the end of June 1944, though it would not be published for another three months.



While testing still required the BV 40 prototypes to be towed aloft, in operation they were to be suspended beneath the wings of He 177s and dropped onto high-value targets – particularly Allied shipping.

The introduction stated, somewhat mysteriously, that "essentially the structural condition of the V1, V2, V3 and V6 is the same. Structural differences occur on the rudders and the controls. It is therefore essential to monitor these deviations.

"The information given for flight operations only relates to the construction status of the V2, the testing of which has not been completed."

A second pilot

The only pilot known to have flown a BV 40 other than Rautenhaus was Wilhelm Ziegler – a Luftwaffe test pilot stationed at the Rechlin test centre. He flew the V2 up to three times at Wenzendorf over the course of two days, July 3-4.

His report states: "The plane is harmless and pleasant to fly. Tow launch on a grass runway becomes more difficult … as take-off speed increases, while on a concrete runway it is flawless.

"Due to too much rudder friction and overly sensitive rudders, a clean target approach is difficult. Landing is greatly simplified by the very effective landing flap and its excellent operation. The prone pilot arrangement is good except for the right armrest."

Rautenhaus made two flights of his own in BV 40 V2 during this period and reported that gusty weather had prevented release above 1,000 metres.

On July 6, 1944, Rautenhaus reported that up to this point the BV 40 V2 had made 12 flights, with the BV 40 programme overall having made 14 (12 plus the two flights made by the BV 40 V1).

The BV 40 programme's 15th test flight overall was made by neither the V1 nor the V2, but rather by the BV 40 V5 – the detail of which is also included in Rautenhaus's July 6 report. He wrote: "The machine is very top-heavy, so the fin is adjusted by minus two degrees. Despite this top-heaviness, the new elevator trim for towing at 250 km/h is entirely sufficient.

"The landing flaps were overbalanced so that they went straight to the 80-degree position and didn't need to be retracted again.

"For the elevator, we ask you to procure a spring that is half as strong, ordered three weeks ago, in order to reduce the forces. A change in the transmission ratio for the elevator does not seem necessary to me."

The V5 and V6 were also airworthy, with the V7 expected to join them in August. The V8 was due for delivery in September, the V9 in October, V10 and V11 in November, V12 and V13 in December, V14 and V15 in January 1945, V16 and V17 in February 1945 and V18 and V19 in March 1945. Work had not begun on anything after V14.

KG 200's demands

During the preceding weeks or possibly months, Tilenius of KG 200 had apparently been bombarding Blohm & Voss with requests and requirements for the BV 40. According to a company project status report of late July 1944, "the large number of different bombs demanded by Fl. Stabsing. Tilenius cannot be installed by us for design reasons. The work situation in our office requires one to limit oneself under all circumstances. That's why we decided to hang a BT700 [anti-shipping torpedo] on the left and right under the wings. The main advantage of this arrangement is that the landing skid is not affected and [the torpedo] can be supplied with all aircraft."

"A development of the machine [BV 40] for other special purposes, with automatic controls, with rocket boosters and as a towed fuel tank, is completely impossible for us. This also eliminates the production run of 200 suggested by Mr Tilenius."

Evidently, Blohm & Voss had grown frustrated with Tilenius's demands.

Cancelled

Back in May, Malz had sent a requirement for a two-seater jet-propelled high-speed research aircraft to Messerschmitt, Heinkel, Arado, Focke-Wulf, Siebel, Blohm & Voss and the Deutsche Forschungsanstalt für Segelflug (DFS).

The deadline for submissions was July 20, 1944, and Arado, Messerschmitt, and the DFS are known to have submitted designs, and Siebel certainly had a keen interest in the project.

As a result, on August 5, a Blohm & Voss memo noted that Czolbe had been in touch, asking that a wingless BV 40 fuselage be sent to Siebel at Halle because "Siebel deals with a project that also includes the prone pilot. The work we have done can undoubtedly be put to good use in such projects in the common interest".

Luftwaffe High Command wrote a very nice letter to Blohm & Voss on August 13, 1944, to formally cancel the BV 40. Headed 'BV 40 work', it said: "Changed operational and tactical conditions and the need to concentrate forces and save on war material have led to the decision to stop further work on your BV 40 model."

Wiped out

Two formations of the 8th Air Force Consolidated B-24 Liberators from the 458th Bomb Group, comprising nine and eight aircraft respectively, bombed Blohm & Voss's Wenzendorf facility unopposed on October 6, 1944; the hangar containing all 14 mothballed BV 40 airframes was hit, and everything within it was evidently wrecked beyond repair.

Vogt sent a brief memo to Siebel on 11, stating: "All BV 40 machines destroyed in an air raid. Therefore, we can only send drawings of a fuselage longitudinal section." A formal company letter followed, which said: "With reference to a call from your senior engineer Horn, we regret that we cannot keep the promise made by director Dr Vogt. It turned out that during the last air raid on our Wenzendorf plant, the BV 40 type machines that were still there were destroyed."

Siebel replied: "With your letter mentioned above, we got your drawing 8-40, which is completely sufficient for our purposes."

Finally, Gothaer Waggonfabrik aerodynamicist Dr. Rudolf Göthert contacted Blohm & Voss in early November 1944 to request information on the BV 40's prone cockpit layout, as he was planning a prone cockpit for his P-60 jet fighter and fighter-bomber series. The company responded on November 9, stating that engineers Scherer and Hagel were available to meet with Göthert at a hotel on Monday, November 13. Göthert followed up with the company after the meeting to ask for details of the BV 40's wing and tail construction; however, this appears to have been the final effort for the glider project. ■

For more, see:
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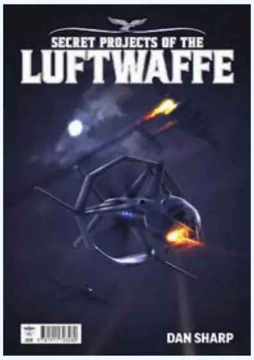

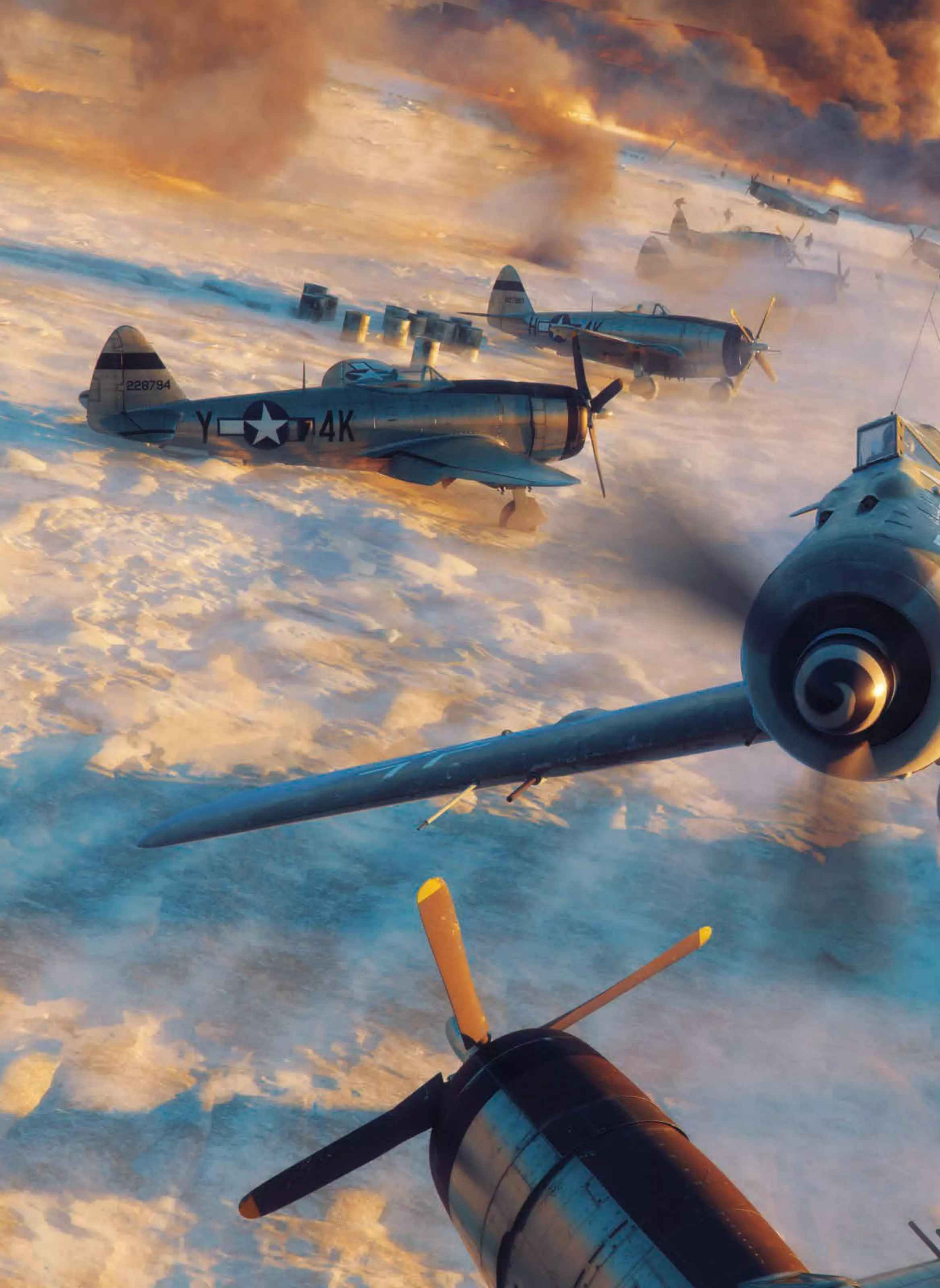
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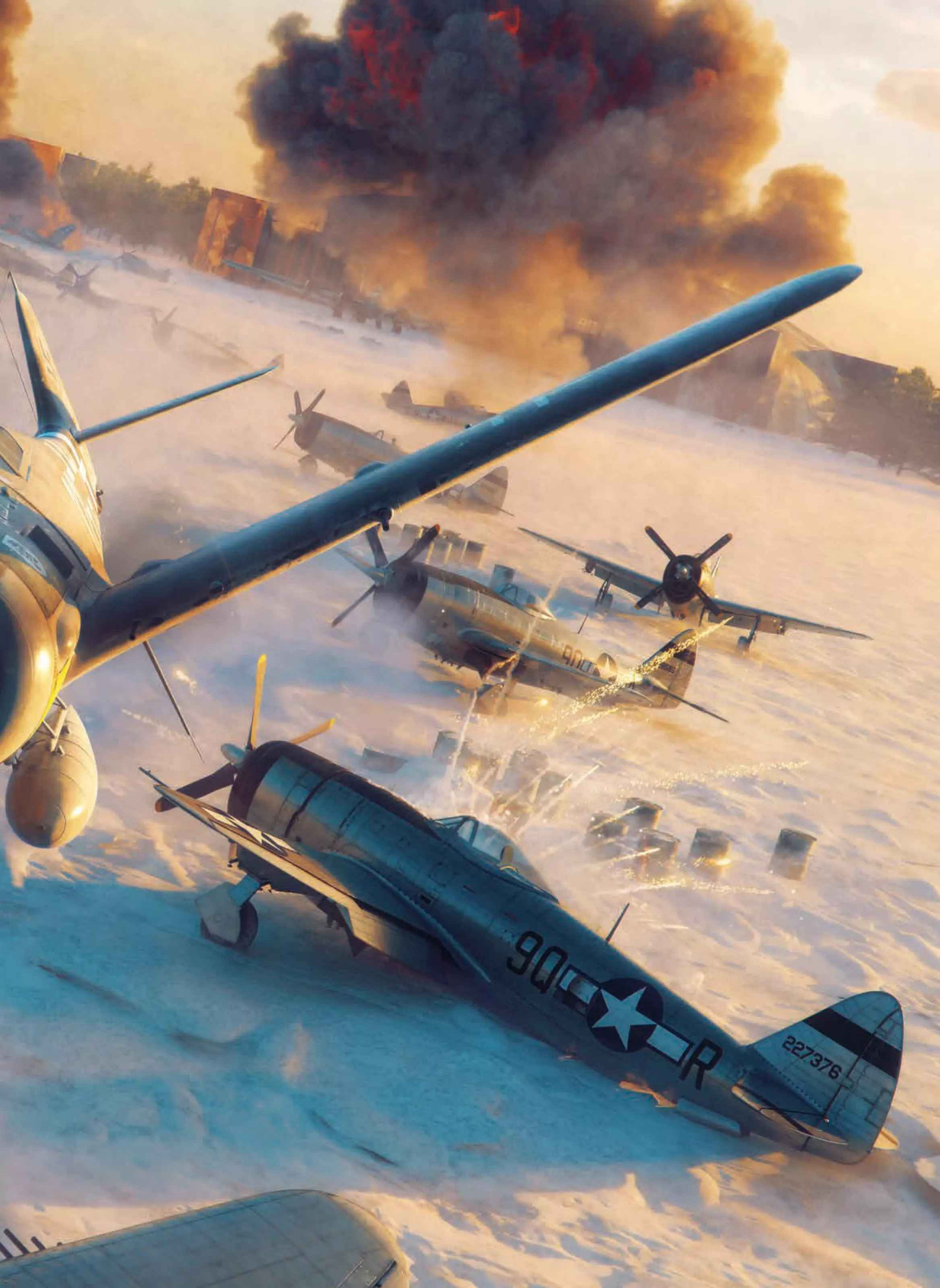
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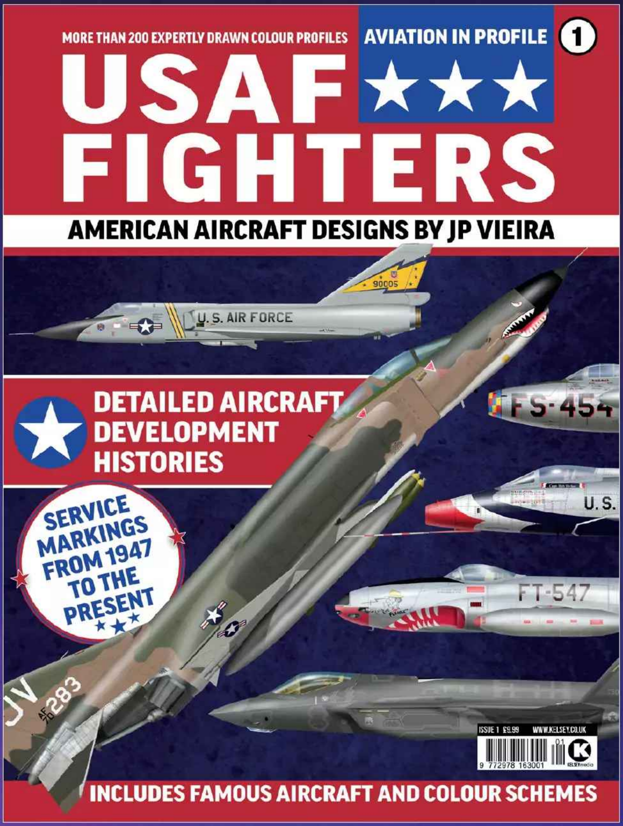
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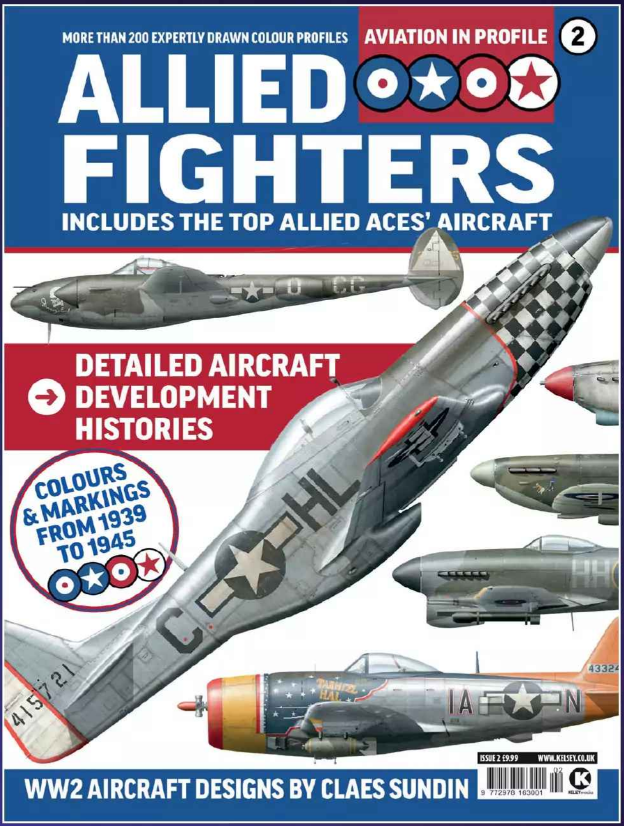
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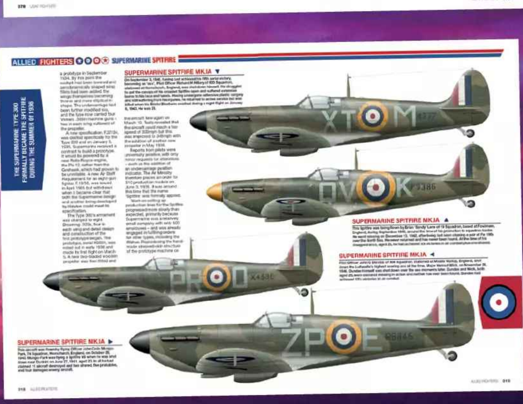
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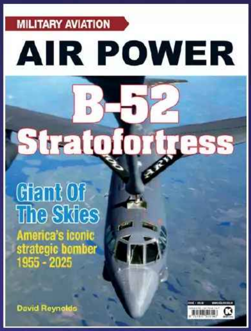
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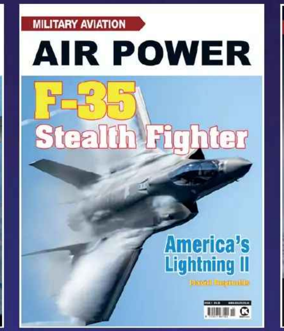
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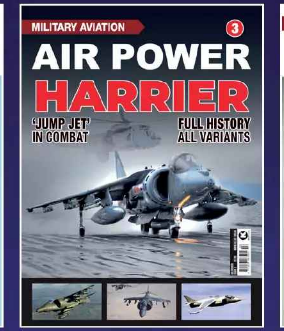
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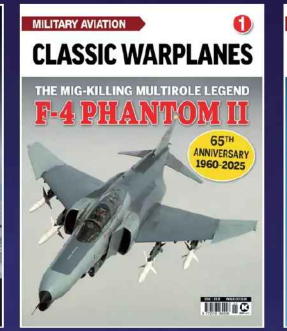
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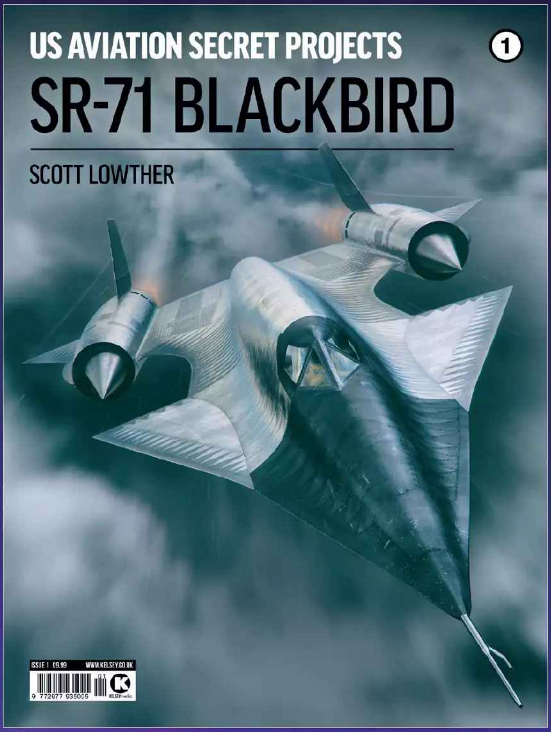
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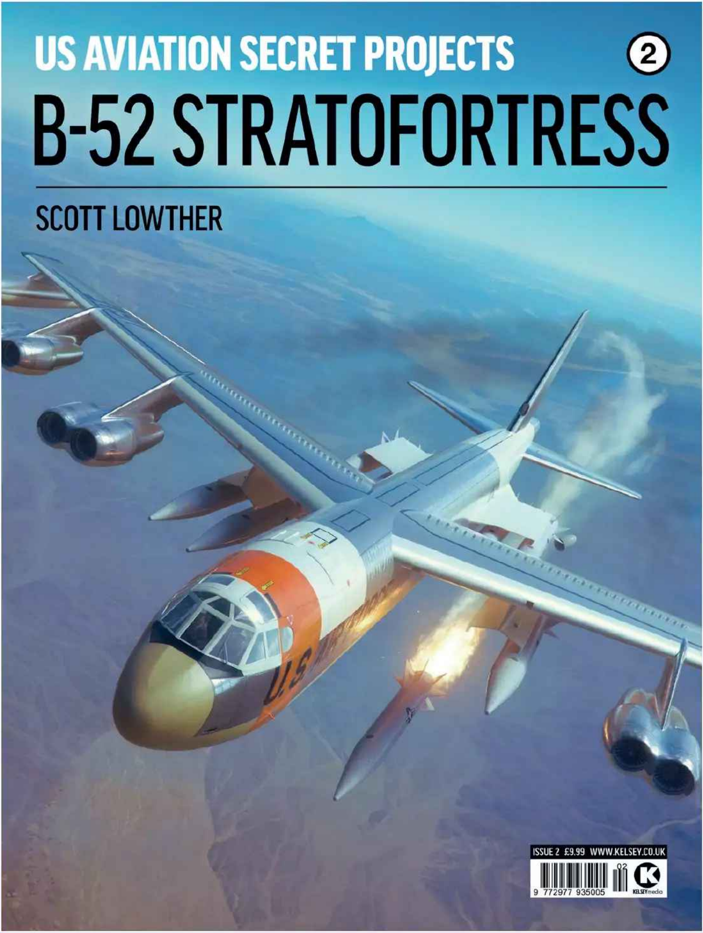
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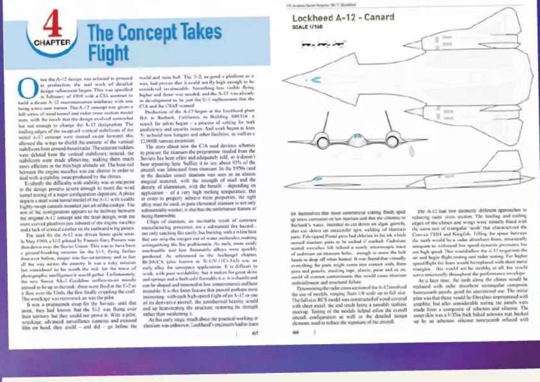
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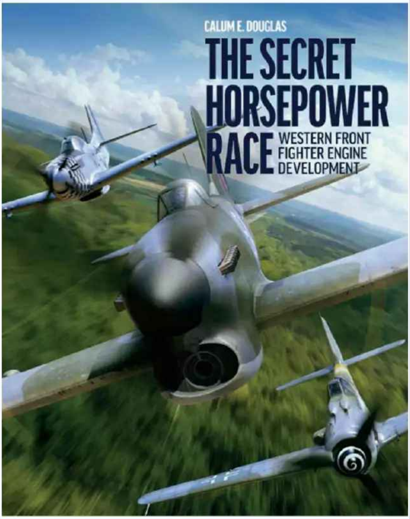
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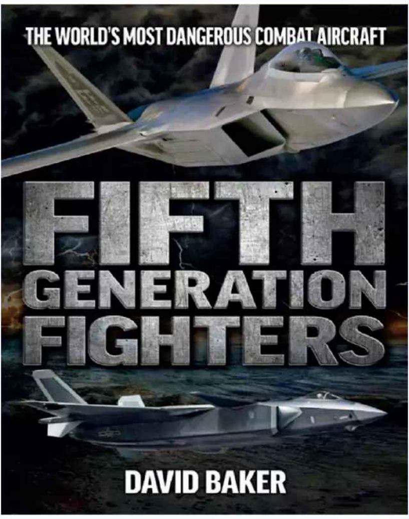
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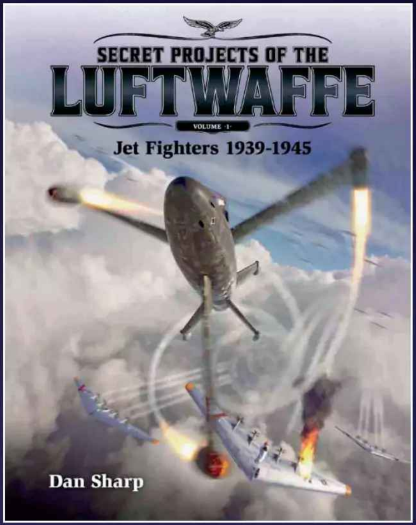
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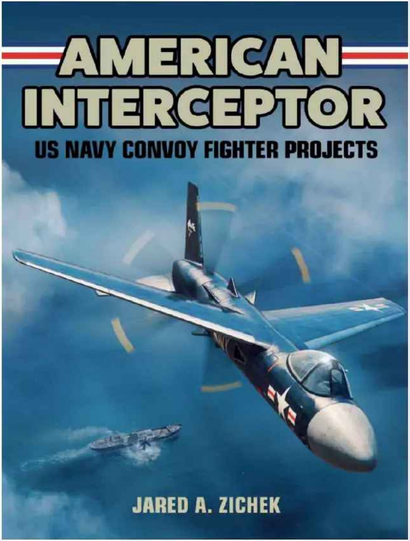
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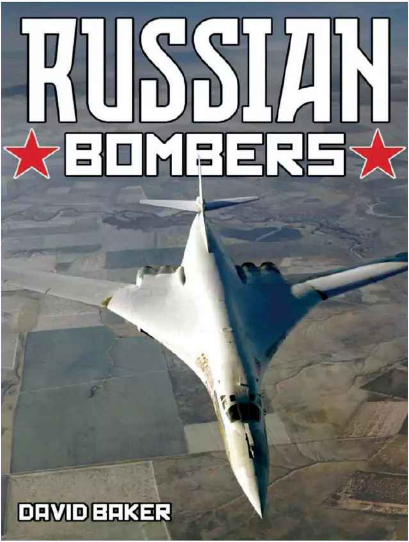
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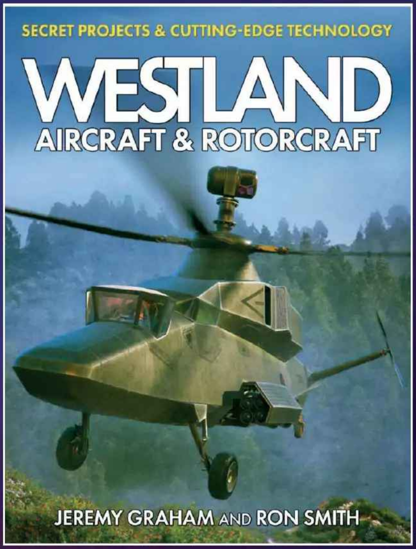
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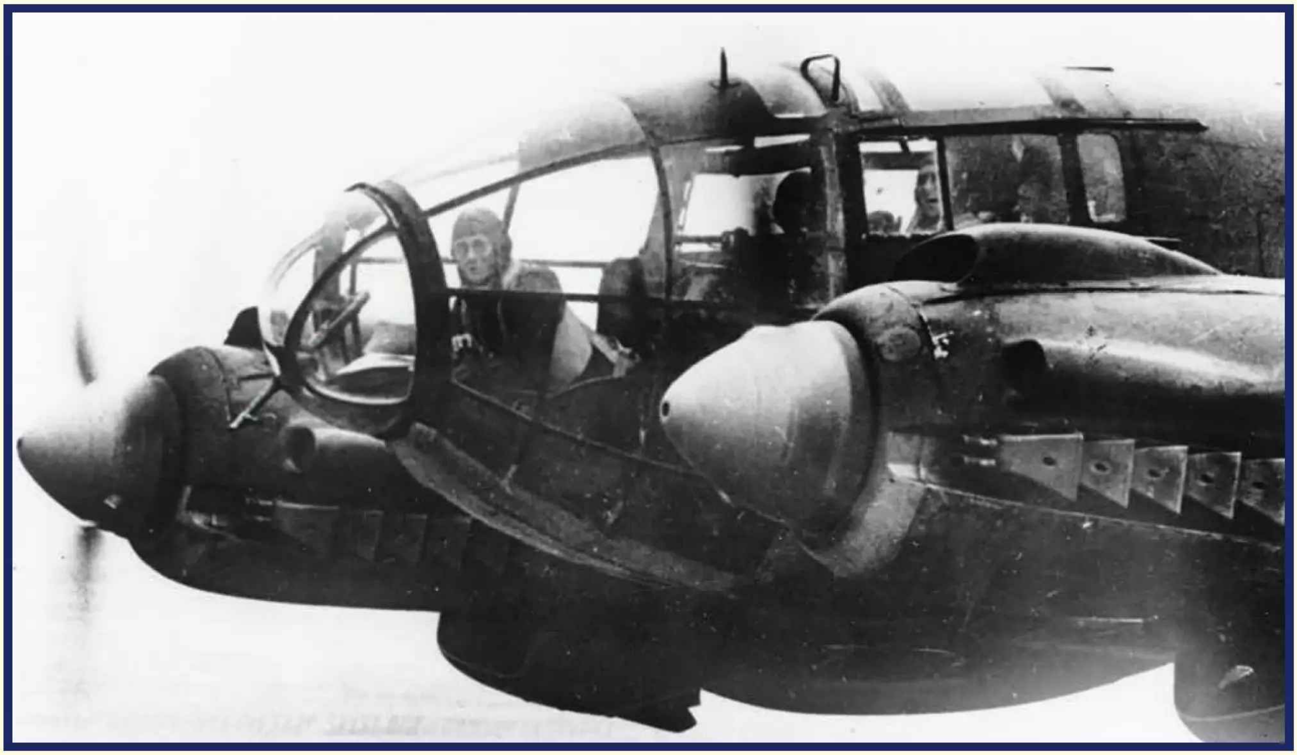

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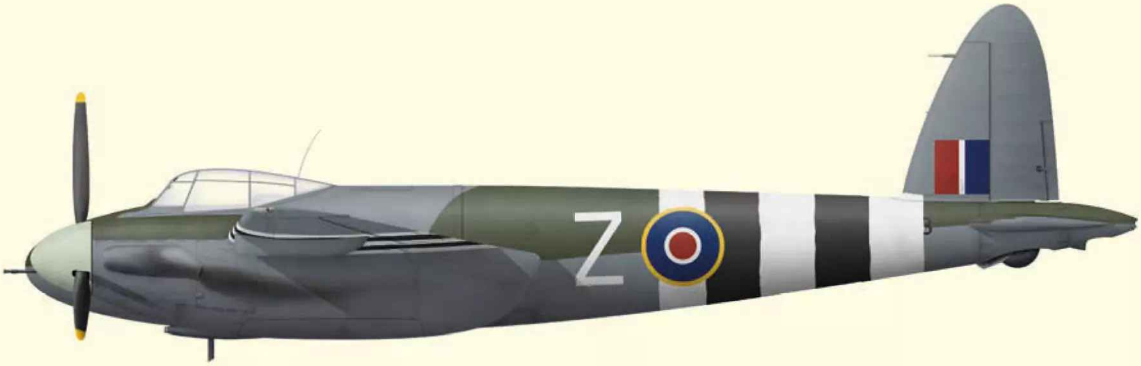

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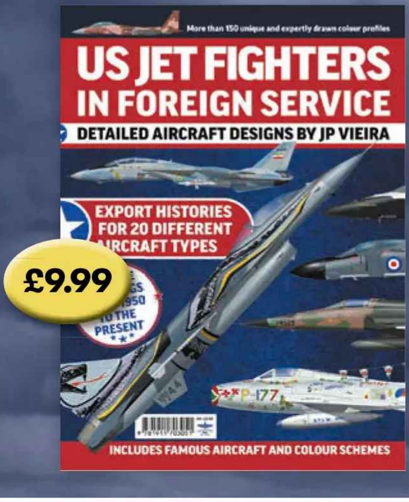
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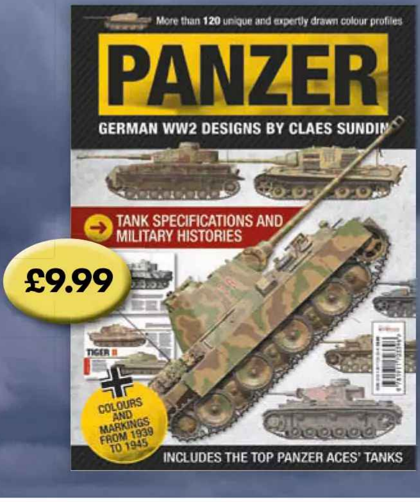

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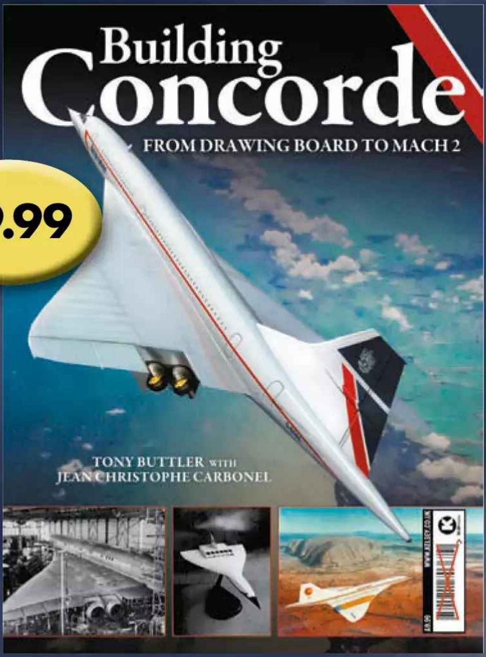
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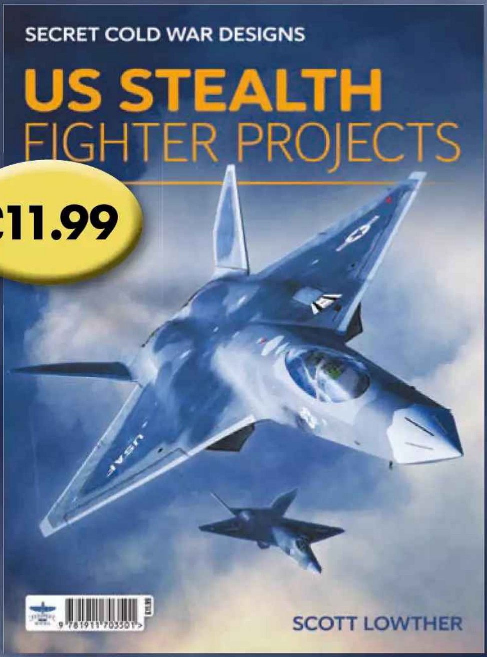
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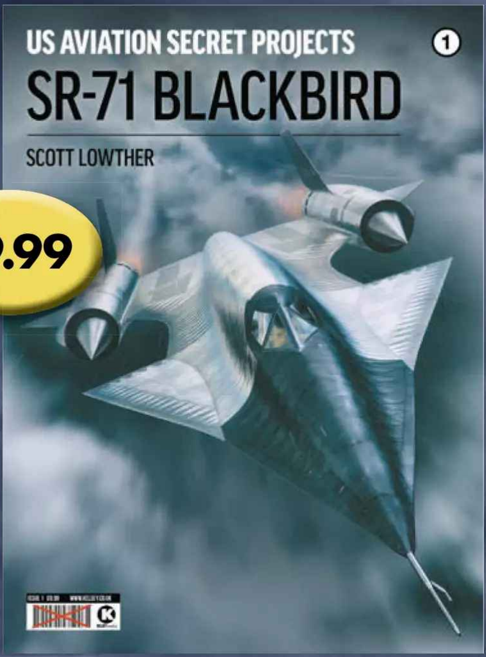
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